



University of Veterinary Medicine Hannover, Foundation

Self Evaluation Report

for the European Association of Establishments for Veterinary Education

Main Volume
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PREFACE

Stiftung Tierärztliche Hochschule Hannover (University of Veterinary Medicine Hannover, Foundation, later referred to as TiHo) has been an independent establishment since its foundation in 1778.

Provisions in the Lower Saxony University Law (Niedersächsisches Hochschulgesetz, NHG) 2002 have provided opportunities to strengthen the autonomous status of universities. The TiHo became an endowed university within a public foundation, with effect from 1 January 2003, the year of the TiHo's 225th anniversary. This brought with it a wide variety of opportunities for furthering excellence in research, teaching and veterinary services. The TiHo aims to develop those opportunities to the benefit of its students, the veterinary profession and society at large. The TiHo has committed itself to the highest standards of quality in all its activities.

In accordance with the Lower Saxony University Law (Niedersächsisches Hochschulgesetz, NHG, 2007) §5, universities are required to carry out internal and external evaluations of research and teaching at regular intervals. Students are to be involved in the evaluation of teaching. Results of evaluations must be published. The evaluation of veterinary education in European veterinary education establishments is conducted by the European Association of Establishments for Veterinary Education (EAEVE). Part of the evaluation process is the preparation of a self-evaluation report (SER) to be prepared by the establishment.

This SER forms the basis for the external evaluation by EAEVE and provides the necessary information to the team of visiting experts. The report of the evaluation process is acknowledged as the external quality evaluation in accordance with the requirements of §5, NHG.

Yet, the EAEVE visitation team is invited to request any incremental information, to visit all TiHo organisational units and to consult with any individuals or groups with or outside the TiHo regarding the intended objective, i.e. evaluation of science based veterinary teaching.

Hannover, 1 November 2007

Dr. Gerhard Greif, President

INTRODUCTION

The main organisational changes

For 90 years until 2001 the TiHo was governed under a rectoral constitution. The Rector and two Vice-rectors served in 2 year-terms part-time. The Chancellor, a civil servant in a full-time post, was head of the administration.

In October 2002, with the new Lower Saxony University Law (Niedersächsisches Hochschulgesetz, NHG), the presidential constitution came into effect, transferring responsibility for the management of the TiHo from the Rectorate to the Presidium. (The text of the NHG is available in German at [http://www.mwk.niedersachsen.de/home/.](http://www.mwk.niedersachsen.de/home/))

The Presidium consists of the President, with a term of office of six years (full-time), which upon re-election would be extended for another eight years; a full-time Vice-President for Administration, and two part-time Vice-Presidents, one each for Research and Teaching. The Presidium is responsible for all strategic and operative decision-making, including the TiHo's objectives and its budget. The Senate elects the Presidium and has the electoral power to suggest removal from office to the 'Stiftungsrat'. The Presidium determines the future development of the TiHo after consultation with the Senate.

The Foundation Board of Trustees (Stiftungsrat) acts as the board of overseers with legal control responsibilities and represents the interests of the public, stakeholders and politics.

New regulations relating to teaching

A national veterinary curriculum (Tierärztliche Approbationsverordnung) regulates the course of study and examinations in all the federal states of Germany. This national curriculum (TappV) (see Annex 6) regulates in detail the number of hours for the various subjects. In its revised version, 2006, it offers, besides other variations, the opportunity of modifying the teaching time offered by +/- 20% in subjects with more than 28 hours, according to judgement and a strategy to optimise veterinary undergraduate teaching (trial clause; Erprobungsklausel). Additionally, teaching timepoints of some subjects were changed (see chapter 4). A better linking of food hygiene with clinical subjects covering farm animals was implemented. Moreover, basic subjects should focus on content relevant to veterinary medical education only. Theoretical and clinical knowledge are to be combined. The TAppV enables the setting up of a model study course.

The committees of the TiHo, with the Vicepresident for Teaching in the Chair, have decided to make changes to teaching according to these new regulations. The changes implemented at the TiHo in accordance with the "trial clause" are as follows:

more hours are offered in the following subjects: propaedeutics, clinical immunology, clinical pharmacology, clinical endocrinology. These hours were generated from chemistry, botany and zoology. The integration between preclinical and clinical subjects is arranged on an individual basis (e.g. anatomy and clinical subjects). The examinations are sat during the lecture-free periods. The practical year, which had already been introduced at the TiHo before the TAppV was enforced, is further supported and safeguarded by this legal framework.

New buildings and major items of equipment

The TiHo has operated the Field Station for Epidemiology in Bakum (near Vechta) since 1991. Located in one of Europe's regions with the highest density of farm animals (esp. pigs and poultry), this facility provides extended means to offer practical training for students in herd diagnostics, herd health management and epidemiology.

After 35 years in the hands of the TiHo, the Farm for Education and Research in Ruthe was modernised in 1999/2000 in state-of-the-art facilities. In 1994 a new pig production unit was completed, followed in 1998 by a laying hen-house, refurbished almost annually with the most modern standard of equipment. In 1999 the new dairy cattle building followed and in 2000 the poultry centre for broilers, turkeys, Muskovy and Peking ducks was added. All facilities are designed to house animals both in state-of-the-art facilities equivalent to those on current commercial farms. Another innovation at the TiHo is the Garden of Medicinal and Toxic Plants, which was opened in May 2000. This specialised garden provides a unique overview of medicinal plants which are also used in veterinary medicine. It serves for courses in botany, animal nutrition and toxicology.

Since March 2007 construction work has been in progress for the new Clinic Complex at Bünteweg (€45 m investment). In the 3rd quarter of 2009 the Clinic for Horses, the Small Animal Clinic and the Clinic for Pets, Reptiles and Pet and Feral Birds are to be housed in this Clinic Complex.

In the first quarter of 2008 construction of a new Research Laboratory Infection Medicine L3 plus /S3 incl. large animal housing (€7 m investment) will begin.

Please see Annex 2 for a list of recently acquired major items of equipment.

Main changes to the study program

In its constant striving for improvement in veterinary training the University of Veterinary Medicine Hannover, Foundation introduced the "practical year" (introduction WS 2004/5). With that the students of the TiHo are integrated in the clinical and scientific daily routine to an increased extent thus intensively gaining practical experience. The practical year replaces the previous 9th and 10th semesters

and thereby forms a transition between the tightly organised course of study and the preparation for the subsequent career. It involves an extramural period of practical training and an internal practical training semester which can be done throughout the whole year in the TiHo institutes and/or clinics.

The extramural practical training includes a practical at an abattoir, a food hygiene practical and a clinical practical (see chapter 4). In the intramural practical semester the students spend 10 to 14 weeks at a clinic of their choice at the TiHo (see description chapter 4). They are involved in all clinical activities (e.g. night duty, primary case responsibility, anaesthesia, surgery etc.). Students with special interest in research work can also complete this practical semester in the Paraclinic, Preclinic and Food Science Institutes. With the possibility of carrying out the intramural practical semester throughout the year, without consideration of semesters, teaching can be organised in small groups. This is an important prerequisite for independent clinical or scientific work.

With the introduction of the new regulations for licence to practice as a veterinary surgeon (TAppV) (see also "New regulations relating to teaching" above) the TiHo has made the following changes: the teaching of pathology (general pathology) and infections (general infections) have been moved from the clinical part to the 4th semester. All examinations, including the first preclinical examination and second preclinical examination in veterinary medicine are spread over the lecture-free periods to facilitate the self-directed learning capacity of students and to ensure the allocation of examinations in a teaching-related manner.

Basic subjects are focussed on relevant veterinary medical training and the theoretical and clinical knowledge during the entire veterinary training are linked as far as possible. Thus, the preclinical teaching is arranged in an integrated manner, by including clinically relevant themes in the preclinical teaching. This is arranged by individual agreement of the teaching staff and documented in the description of the teaching contents to which all teaching staff and students have access as working documents (intranet).

In 1998 the University of Veterinary Medicine Hannover was the first university in Germany to introduce a PhD course leading to the degree of Doctor of Philosophy, which aimed at replacing the postgraduate studies course (Aufbaustudium) which had been introduced about thirty years previously. The major reason for this was to establish a scientific qualification program which is oriented towards the international standard and which allows the reciprocal exchange of students.

The PhD Program "Veterinary Research and Animal Biology" started in 1998. It was accredited by ZEVA (Zentrale Evaluations- und Akkreditierungsagentur Hannover) in 2006. It offers a project-oriented postgraduate research program which is open to graduate students with a degree in veterinary medicine, human medicine, the natural sciences, or agriculture. Applicants must give evidence of outstanding achievement.

The maximum number of applicants accepted is fixed at 20 per year. Each PhD student is accompanied during his studies by a supervisory group consisting of the supervisor, one external expert and one member of the PhD Commission. It is their task to evaluate the PhD student during the course on the basis of reports and examinations and an appraisal of the final written thesis. Each PhD student is invited annually by the PhD Commission to give a report on the status of his/her scientific work and has to pass an oral examination approximately 18 months after commencing the course.

The final PhD examination consists of a public lecture at the TiHo, an oral examination with the supervisory group and evaluations of the written thesis by an external referee and the supervisory group. The PhD course ends with the PhD examination, which must be completed within five years.

A further PhD program between universities was set up by the Centre for Systems Neurosciences (ZSN). The ZSN submitted an application to the Lower Saxony Ministry of Science and Culture (MWK) for funding a new international doctoral course of study in systems neuroscience as part of the MWK's innovative offensive in support of doctoral programs. The three-year PhD program "Systems Neuroscience" begun in the winter semester 2003/2004 is designed to contribute substantially to the training of young scientists in the fields of systems neuroscience and to provide students with the skills they will need for successful research careers. It is conducted jointly by scientists of the TiHo, the Medical School Hannover (MHH), the University, and Hannover University of Music and Theatre under the direction of the ZSN. A maximum of 20 students will be accepted per year (among them preferably 30% to 50% international students).

Important decisions made by the management of the establishment, or by the authorities responsible for it

The new Lower Saxony University Law (NHG) of June 2002 grants the state's establishments of higher education more freedom of action. Based on a desire for more autonomy and for less governmental influence in detailed matters concerning finances and organisation, the TiHo decided to investigate the option of becoming an endowed university within a legally autonomous public foundation (Hochschule in der Trägerschaft einer rechtsfähigen Stiftung des öffentlichen Rechts).

On 1 October 1 2002 when the new Lower Saxony University Law (NHG) came into force, the Presidium and Senate decided to submit an application in accordance with Article 55 of the NHG. On 17 December 2002 the cabinet of the government of Lower Saxony approved the application. The transformation came into effect on 1 January 2003.

The transformation of the TiHo into an endowed university within a public foundation came into effect in accordance with an endowment regulation; the foundation has a

constitution defining its tasks, management matters and governing bodies, such as a board of trustees and presidium. An agreement on objectives determines the financial contributions to be made by the state of Lower Saxony and regulates the transfer of real estate property to the foundation. It should be emphasised that the annual allocation of state funds is independent of the status of the university. State universities and universities under state responsibility (foundations) have to be financed on an equal basis.

Major challenges encountered by the establishment, resolved or remaining unresolved

The TiHo is spread over two campuses, connected by tram, (or 8 minutes by car). A concentration of all buildings on the Bünteweg campus is intended but not finally planned.

The TiHo has to manage appropriate controlling and auditing processes and to implement an overall cost and management accounting (Kosten-Leistungsrechnung) required for overhead cost calculation as requested by the German Research Foundation (DFG) and EU as well as for general cost controlling aspects.

1 OBJECTIVES

1.1 FACTUAL INFORMATION

Official list of the overall objectives of the establishment

The general aims of the TiHo are listed in the overall mission statement (see Annex 1). This was drafted with the University Developmental Commission (HEK, Hochschulentwicklungskommission) and presented to the Senate for approval. Decisions in the presidium and in the committees follow the statements in the overall concept; the long-term strategical goals are derived from this:

- Excellent training in veterinary medicine and animal biology
- Fostering the rising generation of scientists
- High quality continuing education
- Excellence in basic and applied research
- Cooperation with national and international research institutes
- Performance as excellent, competent, modern and motivated teaching and research university
- Performance-oriented allocation of funds, encouragement of innovation and recognition of top performance, adequate investment quota
- Increasing fund-raising of capital incl. foundation funds
- Short transparent decision-making processes
- Fostering synergies and cooperation between the organisational units of the TiHo
- Establishing quality assurance processes at all levels

Moreover, an Agreement on Objectives between the TiHo and the state of Lower Saxony is made which relates explicitly to the objectives in research and teaching. In 2005 the agreement was adopted lasting up to and including 2009. Here the financial allocation of the state to the university is agreed upon and the university in return is committed to achievement in teaching, research and service. The basis for this agreement is the Guarantee Contract (Zukunftsvertrag) between the state of Lower Saxony and the universities that guarantees financing for 5 years (2005-2009). A contractual extension is being prepared at present.

The Presidium determines the official list of the TiHo`s objectives in consultation with the members of the University Developmental Commission (HEK) and the Senate. Tentative goals and underlying finances are agreed upon with the Lower Saxony

Objectives

Ministry of Science and Culture (MWK) in the Agreement on Objectives, revised annually.

The strategic goals of the TiHo and the mission statement are reviewed when deemed necessary, at least after ca. 5 years by the Presidium and the TiHo Developmental Commission and the Senate.

In the case of the Agreement on Objectives between the TiHo and the state the Ministry submits a draft with the terms of agreement for the various areas. The TiHo must submit an annual progress report to the Ministry, upon which the allocation of funds is based.

The Agreement on Objectives is reviewed regularly between officials of the Ministry of Science and Culture (MWK) and the Presidium of the TiHo.

The TiHo publishes a Research Report and a Teaching Report annually. Additionally, the Presidium presents an annual report to the Foundation Board of Trustees on the development of the university. Reports in some further areas have already been presented such as for example in the area of e-learning, on the work of the associated Research Institute for Wildlife Ecology and the tasks and services of the Endocrinological Laboratory.

To compare the performances of institutes and clinics, the teaching index parameter, the publication index and the grant index are measured and disclosed to the Institutes in the form of a ranking with relative positioning to the TiHo average. These indices also serve as a basis for the performance-related allocation of funds.

Furthermore, the TiHo is planning the formal setting up of quality assurance processes in the framework of institutional accreditation, which will be requested from universities in the next 2 years. In preparation for this the review process of general objectives has to be implemented. A process still has to be developed for the internal Agreement on Objectives between the Presidium and the academic institutions.

1.2 COMMENTS

According to the agreement with MWK the TiHo has regularly achieved its goals.

Nevertheless, the TiHo aims to go beyond its politically expected performance. The following paragraphs should underline the commitment of the TiHo in research, research-based teaching and clinical as well as laboratory services to the public.

Of particular significance for the future positioning of the TiHo was the agreement on the key research areas of the TiHo by the Senate. The research of the TiHo centres on: infection medicine, clinical research, systemic neurosciences as well as on animal health and food quality.

In the field of infection medicine the increased demands are taken into account and an application for extending and equipping the L3/S2 virus isolation ward of the TiHo to a L3plus/S3 research laboratory for infection medicine with the keeping of animals has been submitted. After positive consideration by the "Wissenschaftsrat" financing has been assured and start of construction is 2008.

In clinical research the fields of reproduction medicine and biomedical technology should particularly be highlighted. For supporting the field mentioned first, reproduction medicine has been reorganised and the Reproductive Medicine Unit of the Clinics has been created. The Professorship for Gynaecology and Andrology of Horses has been appointed as head of the Unit. To further improve research based teaching in reproduction medicine the building of the insemination ward and embryo-transfer unit in the Clinic for Cattle has been refurbished.

Research in the field of biomedical technology at the TiHo has developed almost meteorically in recent years in the Small Animal Clinic. This is reflected in the participation of the TiHo in the special research area SFB 599 "Foundations of Sustainable Bioresorbable and Permanent Implants Constructed of Metal and Ceramic Substances" and the excellence cluster REBIRTH "From Regenerative Biology to Reconstructive Therapy".

Against the background of further planning for research programmes in the area of biomedical technology the plans for the Clinic Complex (Klinikum) at Bünteweg have been revised and expanded to accommodate necessary research space. Moreover, a third clinic, the Clinic for Pets, Reptiles and Pet and Feral Birds was founded on the future Clinic Complex at Bünteweg. With this the training and teaching at the TiHo is to be adapted with regard to developments in the Small Animal Practice and to take a stronger stand in the field of pets and exotic animals such as for example reptiles, as well as pet and feral birds in service, teaching and research.

The research activities in the field of systemic neurosciences are concentrated in the University Centre for Systemic Neurosciences (ZSN) and have been positively assessed for further state funding. The Centre with a PhD-Program also offers successful training for the rising generation of scientists, funding for which was granted by the European Union in 2006. The Centre received approximately 1.7 million Euros for ten dissertation grants (Promotionsstipendien) from the Marie Curie Early Stage Research Training Program.

The research in the field of animal health and food quality at the TiHo was positively acknowledged in 2006 by funding from the Ministry for Science (Ministerium für Wissenschaft und Kultur). For strengthening the research potential of agronomy and nutritional science two alliance projects within the research alliance of nutritional science were set up and after positive evaluation by the Scientific Commission of Lower Saxony financed with a total of 2.8 m Euros by the state. Institutes of the TiHo are involved in both alliance projects with a total of 3 subordinate projects.

Objectives

With the commitment to core research areas the denominations of professors in the case of re-appointments and new appointments were determined. Alongside demonstrated research excellence interdisciplinarity and cooperation between the clinical and preclinical institutes of the TiHo and within the core research areas are seen as important criteria for future excellent appointments. The TiHo is to announce a large number of professorships in the months ahead in order to strengthen research performance as well as national and international research cooperation and to expand research-based training for students.

In training the TiHo has expanded e-learning offers for students. TiHo offers lecturers a didactic continuously training course to further professionalise training. Additionally, the graduate students are educated in soft skills as well as being offered courses on career information and on starting up a practice. A wide offer of postgraduate training and further education is contained in chapters 11 and 12.

The allocation of funds for research and training from the university to the institutes and clinics is 90% personnel-related and 10% performance-related. The allocation of funds according to performance parameters (incomes from third-party funds e.g. grants) will be successively increased. The distribution of funds for investment in equipment for the Institutes is 100% performance-orientated; here publications-, third-party funds-, service- and teaching indexes are taken into consideration.

Main strengths of the TiHo:

- University`s focus is veterinary medicine
- Endowed university with guaranteed state funding
- Advanced status of autonomy
- Independance and utmost flexibility in personnel decisions i.e. selection of faculty members and deployment of resources
- Species clinics with strong scientific focus and significant number of patients (pets and horses as well as farm animals) for clinical teaching and research
- Practical training for students in epidemiology and herd health management with focus on intensive agricultural production (Field Station for Epidemiology in Bakum)
- Practical training for all students in handling and management of food-producing animals (livestock farming at the Farm for Research and Education in Ruthe)
- Number of necropsies in the Institute of Pathology, in Bakum (swine only) and Clinic for Poultry, permitting comprehensive training covering all species

- Commitments to animal welfare: farm animals (Institute for Animal Hygiene, Animal Welfare and Behaviour of Farm Animals) and pets, laboratory animals and horses (Institute for Animal Welfare and Behaviour and Centre for Animal Welfare)
- PhD programs for advanced postgraduate education
- Co-operation with other establishments concerning teaching and research by founding "virtual" departments in order to enforce cooperation in undergraduate and graduate education as well as in research. They consist of working groups from different universities and research establishments in and around Hannover, which are active in the respective fields.
- Involvement in three Collaborative Research Centres: SFB 621, "Pathobiology of the Intestinal Mucosa"; SFB 587, "Immune Reactions of the Lung in Infection and Allergy"; SFB 599, "Sustainable Bioresorbable and Permanent Implants of Metallic and Ceramic Materials", SFB/ Transregio 37.
- Involvement in Excellence Cluster: "From Regenerative Biology to Reconstructive Therapy, Rebirth" (special initiative of the government and the states to support particularly successful innovative topics and efficient structures).

Weaknesses/challenges:

- Capacity regulation (Kapazitätsverordnung)
- Selection of students, male/female ratio
- One campus university only in the long term

1.3 SUGGESTIONS

1. Agreements on Objectives between Presidium and Institutes, as well as performance-related allocation of funds
2. Increase the acceptance of new technologies in teaching (e-learning, on-line exams, blended learning)

2 ORGANISATION

2.1 FACTUAL INFORMATION

Name of the establishment:

Stiftung Tierärztliche Hochschule Hannover
(University of Veterinary Medicine Hannover, Foundation)

Address:

Bünteweg 2, D-30559 Hannover, Germany
Telephone (President's office): +49 (0) 511 9 53-8001
Fax (President's office): +49 (0) 511 95 3-82-8001
Website: www.tiho-hannover.de

Title and name of head of the establishment:

Dr. Gerhard Greif, President

Is the establishment within a university?

No, it is an autonomous university

Details of the competent authority overseeing the establishment

The University of Veterinary Medicine Hannover, Foundation, (TiHo) is a scientific institution of higher education of the state of Lower Saxony. The fundamental principles of the organisation are anchored in the Lower Saxony University Law (NHG), which was passed by the legislature on 24 June 2002, being amended in 2006, in conjunction with the reform of this University Law.

Until 31 December 2002 the administration of the establishment was subject to supervision by the Ministry of Science and Culture in legal matters and in all matters pertaining to the state of Lower Saxony as set out in the University Law (Article 51, Paragraph 1, NHG).

Address:

Niedersächsisches Ministerium für Wissenschaft und Kultur
Lower Saxony Ministry of Science and Culture
Leibnizufer 9 (Postfach 2 61)
D-30002 Hannover, Germany

On 1 January 2003 the University of Veterinary Medicine Hannover became an endowed university within a public foundation. The foundation is subject to legal supervision by the Lower Saxony Ministry of Science and Culture as set out in the

University Law (Article 62, Paragraph 1, NHG). Appropriate measures for such supervision are prepared and enforced by a board of trustees as set out in the University Law (Article 60, Paragraph 3, NHG).

The legal bodies of the foundation comprise the Presidium and the Foundation Board of Trustees (Stiftungsrat), which consists of seven members, at least three of which must be women. Five members (not from the TiHo) are elected by the Senate; these members must be representatives of business/industry, science or culture who are familiar with higher education. Furthermore, the Board must include one representative from the Senate of the TiHo and one from the Ministry of Science and Culture named by the minister (Article 59, NHG).

The Board of Trustees advises the establishment, makes decisions of fundamental importance to the foundation and monitors the activities of the foundation (Article 60, Paragraph 2, NHG). The Presidium conducts the routine business affairs of the foundation and prepares and implements resolutions for the Board of Trustees (Article 61, Paragraph 1, NHG).

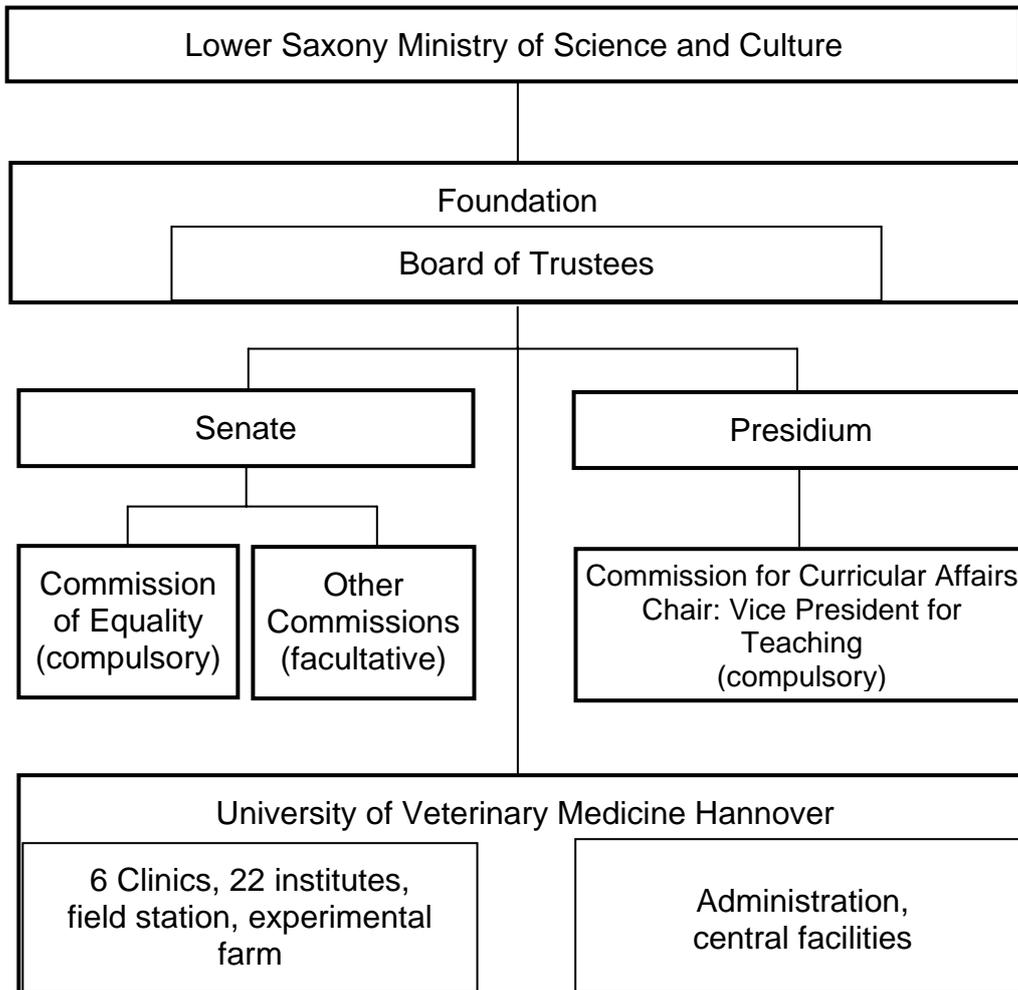
Supervision of the Veterinary Licensing Examination is the responsibility of the Lower Saxony Ministry of Nutrition, Agriculture and Forestry. This Ministry also appoints the members of examining committees for the preclinical and clinical examinations. In accordance with the National Curriculum Regulations (TAppV), professors of the establishment serve as the chair and substitute chair of the examining committees; additional committee members are professors or other instructors in the subjects being examined.

The formal Veterinary Licensing Authority is the Chamber of Veterinaries of Lower Saxony (Tierärztekammer Niedersachsen).

Address:

Niedersächsisches Ministerium für Ernährung, Landwirtschaft und Forsten
(Lower Saxony Ministry of Nutrition, Agriculture and Forestry)
Calenberger Straße 2
D-30169 Hannover, Germany

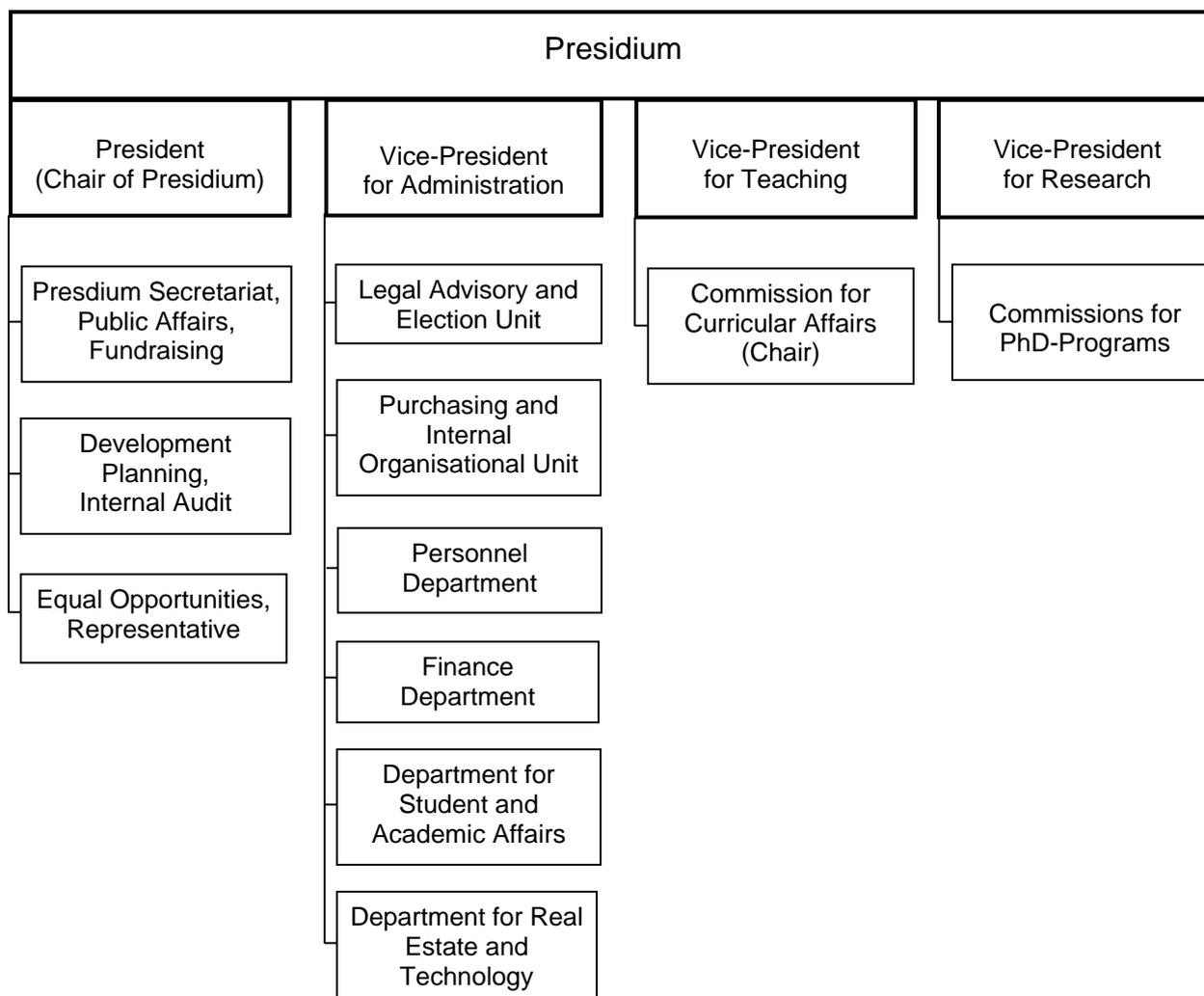
Interrelationship between Ministry, Foundation and the University of Veterinary Medicine Hannover



Overview of the Clinics and Scientific Organisational Units of the University of Veterinary Medicine Hannover

Preclinical	Clinical	Paraclinical
Institute for Anatomy	Clinic for Cattle	Institute for Food Quality and Food Safety
Institute for Food Toxicology and Analytical Chemistry – Analytical Chemistry and Endocrinology –	Clinic for Horses	Institute for Food Toxicology and Analytical Chemistry – Toxicology –
Institute for Physiology	Clinic for Poultry	Institute for Microbiology (Dept. of Infectious Diseases)
Institute for General Radiology and Medical Physics	Clinic for Swine, Small Ruminants and Forensic Medicine	Institute for Immunology
Institute for the History of Veterinary Medicine and Domestic Animals	Small Animal Clinic	Institute for Animal Nutrition
Institute for Biometry, Epidemiology and Information Processing (IBEI)	Unit of Reproductive Medicine of the clinics	Institute for Virology (Dept. of Infectious Diseases)
Institute for Animal Ecology and Cell Biology	Fish Pathology and Fish Farming (integrated into the Institute of Parasitology)	Institute for Animal Breeding and Genetics
Institute for Zoology	Clinic for Pets, Reptiles and pet and feral Birds (future)	Institute for Parasitology (Dept. of Infectious Diseases)
Institute for Biochemistry		Institute for Pharmacology, Toxicology and Pharmacy
Institute for Reproduction Biology		Institute for Pathology
		Institute for Animal Hygiene, Animal Welfare and Behaviour of Farm Animals
		Institute for Animal Welfare and Behaviour (Pet and Laboratory Animals and Horses)
Other		
Field Station for Epidemiology in Bakum		
Farm for Education and Research in Ruthe		
Institute for Wildlife Research		

Allocation of Duties of the Presidium and Assigned Administrative Areas



The central administrative bodies dealing with academic and administrative affairs of the TiHo are the Presidium and the Senate (in accordance with Article 36, Paragraph 1 of the NHG). The Presidium is responsible for all matters not assigned to any other unit (Article 37, Paragraph 1, NHG). The Presidium is essentially responsible for deciding goals and objectives, the budget, the distribution of rewards for performance and achievement within the TiHo. Furthermore, the President is responsible for the legal supervision of the administrative bodies of the TiHo and its students (Article 37, Paragraph 3, NHG).

In addition to the President, there is at least one full-time Vice-Presidents in the Presidium (Article 37, Paragraph 4, NHG). The Presidium of the University of Veterinary Medicine also includes two Vice-Presidents, one for teaching and the other for research.

The Senate decides upon the regulations of the establishment (Article 41, Paragraph 1, NHG). It also determines the planning of future developments and the provisions for equal opportunity for women in consultation with the Presidium (Article 41, Paragraph 1, NHG).

The Lower Saxony University Law (NHG) requires only one permanent commission. This is the Commission for Curricular Affairs (Article 45, NHG). At least half of the voting members must be students. The size of the Commission is determined by the member of the Presidium responsible for teaching. Additional commissions may be constituted by the Senate. Any other regulations are made in accordance with the Basic Governing Principles and other applicable regulations issued by the establishment. The University Law allows the universities extensive freedom in these matters.

The Board of Trustees advises the TiHo, makes decisions on matters of fundamental importance to the Foundation, and oversees the work of the Presidium. Among the duties of the Board are the appointment and dismissal of members of the Presidium and the legal supervision of the TiHo. The Board approves the budget. It receives the annual report submitted by the Presidium, (Article 60, Paragraph 2, NHG).

So far, there has neither been a formal counselling activity with external institutions with regard to the management of the TiHo nor involvement in academic matters e.g. staff selection.

The veterinary medical associations and chambers along with veterinary establishments and ministries are involved in modifications to the National Curriculum (TAppV). Furthermore, stakeholders are involved in curricular matters on a national basis.

An agreement regarding the content of the extramural practicals has been drawn up and implemented after consultation with the TiHo-Alumni expert groups. E-learning programs which are suitable for students and for continuing education are being worked out together with the Lower Saxony Chamber of Veterinaries.

Additionally, individual scientists of the TiHo serve in many different capacities as advisers of administration and politics at state, national and EU levels.

The Ministry of Nutrition, Agriculture and Forestry is involved in administering veterinary examinations.

Particularly characteristic of the TiHo are its separate organisational units devoted to the areas of animal welfare, animal behaviour, animal husbandry, and the food sciences; these structural entities are a response to societal needs and expectations reflected in the new National Curriculum (TAppV).

Organisation

The President is formally appointed by the 'Stiftungsrat' (Board of Trustees) upon recommendation of the Senate. The Senate sets up a Search committee in preparation of this recommendation (in accordance with Article 38, Paragraph 2, NHG). The Search Committee consists of an equal number of representatives of the University and of the Foundation's Board of Trustees. One representative from the Lower Saxony Ministry of Science and Culture serves as a member with an advisory capacity (Article 38, Paragraph 2, NHG). The Senate then decides on its recommendation. The same procedure applies to the appointment of the Vice-Presidents; however, here the recommendation of the Search Committee is made in consultation with the President (Article 39, NHG).

The Senate can recommend the removal of a member of the Presidium by a vote of two-thirds of its members (Article 40, NHG). The proposal requires the confirmation of the Foundation's Board of Trustees. The Senate of the TiHo is elected every two years by its students, faculty and staff, who elect the representatives for their respective groups. Further regulations, such as the appointment of the directors of clinics and departments, are not specified by University Law (NHG); these matters are determined by the provisions of the Basic Governing Principles of the TiHo.

2.2 COMMENTS

The Lower Saxony University Law allows extensive freedom in administrative procedures. Such regulations are laid down in the Basic Governing Principles.

The TiHo has five clinics, 22 institutes, one field station and one experimental farm. For optimal organisation, co-ordination and communication, the Senate has established four Central Commissions (Fachkommissionen) for the preclinical, paraclinical and clinical subjects and biology. Every organisational unit is a member of at least one of these commissions. The chairperson of these four commissions have an advisory function in the TiHo Senate.

For using synergies and enhancement of cooperation centres were created within the TiHo: the Centre for Infection Medicine, the Centre for Food Sciences, the Clinical Centre and the Unit of Reproductive Medicine of the Clinicals.

3 FINANCES

3.1 FACTUAL INFORMATION

Since 1 January 2001 the TiHo has been allowed to operate under a lump-sum budget, which permits a flexible allocation of funds and the accrual of capital reserves. Previous regulations were much more rigid and did not permit capital reserves to be accrued.

The budget for 2007, running up to and including 2008, is determined by the agreement on goals and objectives between the TiHo and the Ministry of Science and Culture established in 2005.

3.1.1 GENERAL INFORMATION

Indicate whether the Faculty's current financial model (system) meets the Faculty's mission.

Since 2003 a formally bound allocation of funds for research and teaching has existed. Here 90% of the funds are allocated for standard equipment dependent on the number of scientists. 10% of the allocation is performance-dependent according to the amount of income from third-party funds of the institute.

In 2006 for investments over and above 5,000 Euros in particular cases a performance-dependent distribution model was introduced in order to award the available funds more fairly to all university institutes. The model considers the distribution of funds according to indices: publication-, grant-, service- and teaching-indexes. Furthermore, the model allows accruals for future investments enabling a greater flexibility for the organisational units.

In addition please specify:

- **How the allocation of funding (including public funding) to the Faculty is determined, and by which body.**

The funds are allocated to the TiHo on the basis of agreements on objectives made with the Ministry of Science and Culture.

- **If the allocation of funds, or any significant proportion of it, is linked to a particular factor (e.g. student numbers, research output), please describe this.**

Allocation of funding is based on performance criteria set out in the agreement on objectives. Here the amount of income from third-party funds for research or the number of students graduating in the standard period of study and fulfilment of the

capacity of student places will play a role. Regular evaluation will determine whether these goals and objectives have been achieved.

- **How the basis for funding the Faculty compares with that of teaching in other courses (e.g. whether veterinary training receives a higher budget weighting compared to other disciplines). How the allocation of funds within the Faculty is decided.**

It is an accepted fact that the veterinary medicine course of study is expensive and that its costs are therefore comparably high. The contributions to public health justify the expense of this course of study.

The allocation of flexible funds to the individual Institutes within the TiHo is determined by the number of scientific personnel and so called 'Performance Parameters', the amount of income from third-party research funds (at present 10% of the funds are subject to performance based allocation).

- **What are the mechanisms for funding major equipment and its replacement?**

Equipment up to an amount of 5,000 Euros is basically financed from financial aid for research and teaching of the institutes. For obtaining equipment costing between 5,000 and 200,000 Euros the institutes receive a performance-related allocation for investments annually. These funds can be accrued over the years in order to enable larger purchases to be made.

For purchasing large equipment over €100,000 application for additional funds is submitted to the state and federal government. In the case of co-financing by the federal government the research equipment has to serve almost exclusively research purposes; a Scientific Commission appointed by the federal government decides on co-financing in a two-stage submission procedure.

- **The mechanism(s) for funding capital expenditure (e.g. building work, major items of equipment) and how decisions are taken in this matter.**

For new building constructions the universities submit an application for funding to the state. When it is a question of research buildings then additional money can also be applied for from the federal and state government via a scientific expert evaluation.

In the case of purchasing equipment on a large scale, e.g. for offers of appointments the universities in Lower Saxony have to hold back a certain amount of the allocation of state funds (at present 1.5% i.e. €706,000) for equipment and for innovation projects. Additionally, the possibility exists via DFG and VW-Foundation for submitting an application for funds.

- **The mechanism(s) to provide the necessary support for building maintenance and how decisions are taken in this matter.**

In the annual allocation from the state, funds for the upkeep of buildings are included. The department for Technology and Real Estate always has an overview of necessary facility maintenance needs. In consultation with the Presidium measures such as improvements, re-building or technical renewal are planned.

3.1.2 INFORMATION ON EXTRA INCOME

All additional income remains entirely at the TiHo. Income from third-party funds of the institutes from industry research, services or donations is charged with an overhead of 10%, which reaches the central funds of the University. From these funds, grants, EDP-equipment, special projects, e-learning etc are financed and flexibility in case of constant investment needs is maintained.

Students pay semester registration fees (Einschreibegebühr) of €245.41. These are not available to the TiHo, as they must be handed over to the Student Services Office (Studentenwerk), the Student Committee (AStA) and the state (as a contribution to administrative costs). Included in the semester registration fees is €116.01 for a semester ticket which allows free use of public means of transport in Lower Saxony. The amount of the fees is fixed by the above named organisations and the Ministry of Science and Culture.

Since the winter semester 2006/2007 in addition to the semester registration fee the students pay a student contribution to the University. The payment and the amount of €500 per semester were stipulated by law (NHG, Article 11).

The student contributions which were available in WS 06/07 were used to augment small group teaching in clinical teaching and to supplement the number of student and scientific assistants (wissenschaftliche Hilfskräfte) in all practical areas of teaching (Clinics and Institutes).

Further, a distribution of the student contribution to areas such as library text-book collection, e-learning activities, computer equipment in the CIP-pool as well as equipment for course rooms and lecture halls is planned. The use of funds occurs after consultation with representatives of the AStA, the institutes and clinics and the university management, which appeals for suggestions concerning the use of student contributions. In addition, the Commission for Curricular Affairs advises on how the contributions should be used.

3.1.3 OVERVIEW INCOME (REVENUE) AND EXPENDITURE

Table 3.1: Income/Revenue

Year	State (government)	Income generated by the TiHo			Total
	To TiHo	Income from services	Research	Other *	
2006	47,657,000	8,507,000	9,291,000	5,671,000	71,126,000
2005	48,505,000	8,083,000	7,331,000	3,346,000	67,265,000
2004	49,591,000	8,110,000	8,198,000	7,198,000	73,097,000

* Allocations for buildings, refunds for acquisition, VAT-refund, student contributions/administrative cost contributions/long-term student fees, income from rent and lease, reimbursement of staff costs

Table 3.2: Expenditure

Year					Total
	Salaries	Teaching and Research support	Clinical diagnostic support	Other *	
2006	42,357,000	8,293,000	4,639,000	15,837,000	71,126,000
2005	40,966,000	6,657,000	4,139,000	15,503,000	67,265,000
2004	42,270,000	6,447,000	3,561,000	20,819,000	73,097,000

* Expenditure for constructions, building maintenance, land acquisition, expenditure for land and buildings (building maintenance), rent for the real estate "Bi-Damm", central expenditure, energy, EDP, library, accruals

3.2 COMMENTS

After the state had carried out significant cost-saving measures and had drastically cut the funds for universities in 2004 (for the TiHo by 4%), a contract between state and universities was guaranteed up to 2009. With that the TiHo has been given a planning certainty which allows strategic planning of investments etc.

Teaching establishments never have enough finance. Please comment on any of the "Guidelines and Requirements" that are particularly difficult to fulfil in the present financial situation.

In general, teaching facilities are cramped and classes must be repeated due to increased numbers of students. Some lecture halls are designed for smaller numbers per semester so that some courses have to be held several times. Completion of the new Clinic Am Bünteweg will resolve those issues.

For raising funds beyond its allocated budget for first-class scientists and university professors the TiHo can apply for supporting funds from Ministry.

What is your number one priority for the use of any increased funding?

- Improving the teaching infrastructure (e.g. technical equipment)
- Intensifying teaching by focussing on small groups
- Recruiting first-rate scientists
- Introducing rewards for excellent achievement and performance
- Rewarding doctoral candidates for performance
- Co-financing endowed chairs and grant-funded projects

Comment on the degree of autonomy and flexibility available to the establishment in financial matters.

From 2001 the TiHo has been required to operate with a lump-sum budget, which essentially means it is possible to balance a deficit in one line item by surpluses in another one. In addition this system has led to the possibility of accruing reserves.

The conversion of the TiHo to an endowed establishment within a Foundation has given the establishment a large degree of autonomy and flexibility, and although funding is still allocated by the Ministry on the basis of the agreement on objectives, the state no longer has any influence on details. Furthermore, the TiHo can build up its own capital from income and private donations. By law, these revenues may not be deducted from the funding provided by the state.

Comment on the percentage of income from outside services that the establishment is allowed to retain for its own use, and in particular on the extent to which loss of this income acts as a disincentive for the services concerned.

All income is retained by the TiHo.

3.3 SUGGESTIONS

The general goal is to enable the TiHo to make investments such as start-up and cofinancing of research projects, rewards for excellence in teaching and research, grants, strategically desirable projects, funds for recruiting top-quality personnel. The calculation of overheads in grant funding and income from services is currently being reconsidered.

Post-graduate training should be given more support from the Ministry.

The development of strategic planning is geared towards receiving more funds from donated monies and endowment contributions.

4 CURRICULUM

4.1 FACTUAL INFORMATION

A defined national curriculum and several additional by-laws govern the studies at the TiHo.

The **national veterinary curriculum** (TAppV) is a national by-law governing the course of studies in veterinary medicine in Germany and of course at the TiHo. The TAppV regulates the subjects to be taught, the number of hours to be taken by each student in each subject, and the content of examinations.

The **teaching obligation regulation** (Lehrverpflichtungsverordnung) is a state by-law. It specifies the number of hours to be taught per year by each faculty member. Thus, each professor has to teach 8 hours per week, each member of staff in a permanent budgeted position has to teach 10 hours per week. Staff members with a non-permanent budgeted position have to teach 4 hours per week. Teaching in practical, laboratory or clinical classes counts only as half (i.e., 16 hours laboratory classes equals 8 hours of lectures). Personnel in clinical and paraclinical sciences are conceded a reduction of 30% due to their responsibilities in patient care and diagnostics and are thus required to teach 5.6 hours. The sum of the individual teaching hours to be given results in the **total teaching capacity** of an establishment.

The **national teaching capacity regulation** (Kapazitätsverordnung) is a national by-law which, together with the teaching obligation regulation, forms the basis for the number of students to be admitted each semester; the number is calculated by dividing the **total teaching capacity** by the so-called **curriculum norm value** (Curricularnormwert). This abstract value given in the teaching capacity regulation is a measure for the amount of teaching required per student in a certain subject. The curriculum norm value for veterinary medicine is 7.6. Due to these regulations the TiHo has a teaching load of 1,843.8 hours for the total budgeted scientific personnel. These hours together with the adjustment of a certain dwindling factor (set-off for students withdrawing from university course of studies, those changing their place of study) divided by the curriculum norm value have resulted in 255 student places/year for the TiHo from this year.

The TiHo cannot change the curriculum in general. An exception would be the development of a model course of study in order to field test new models in veterinary medical education. Such a model course of study must, however, be approved by the responsible public authority. In addition, the TAppV allows under certain circumstances the number of hours to be given in every subject with more than 28 hours to be changed at a rate of 20% (trial clause). Therefore, the TiHo has decreased the given hours in botany, chemistry, zoology to enhance hours for clinical

education. The TiHo-specific interpretation of the TAppV is outlined in the **conditions of study** (Studienordnung). The establishment is free to determine the ratio of lectures to courses and clinical classes in each subject and to decide on the teaching style (i.e. individual classes or blocks on certain subjects facilitating a problem-oriented approach).). The TiHo can decide on the introduction and form of the practical year. However, it required the permission of the Ministry in order to introduce an orientation phase in a semester particularly enabling this orientation phase not only in the clinics, but also in research and food subjects.

All decisions on curricular matters are discussed in the **commission for curricular affairs** (Zentrale Studienkommission), and a recommendation is submitted to the Senate for approval; both bodies are defined in the state University Law (NHG). Course contents are determined by the institute or clinic responsible for teaching and are discussed and decided in the four Central Commissions. Course contents are published on the intranet to facilitate arrangement between different institutes and clinics.

The allocation of hours among various subjects is given by the TAppV. The balance between theoretical and practical teaching is decided by the clinic or institute responsible for the subject and discussed in the four Central Commissions. In general, teachers provide as much practical or clinical training as possible in every subject.

The TAppV also specifies that **interdisciplinary subjects** (Querschnittsunterricht) in clinical education and in food hygiene (196 hours) are compulsory for students. In these interdisciplinary subjects contents of clinical subjects are implemented in combination e.g. with subjects which deal with the effect of ionising rays, residue problematics, environmental contamination as well as food, meat- and milk hygiene. All stages of food production (examination of live animals, illnesses of live animals in comparison to illnesses seen in pathology and on slaughtered carcasses) are integrated in this program. In addition, problem-based teaching is provided in small groups. Preclinical subjects are taught to a certain degree in an interdisciplinary content with clinical teachers in order to enhance students` interest in preclinical subjects. This system is well established especially in anatomy classes. Therefore, the tables showing EU subjects cannot give precise numbers of hours, since some clinical aspects are taught for about 20 minutes in preclinical classes and a certain degree of estimation was necessary.

4.1.1 POWER OF SUBJECTS AND TYPES OF TRAINING

4.1.1.1 Power of subject

The core subjects are regulated by the TAppV and have to be taught for every student (see subjects of examinations). Since the trial clause offers the possibility of changing subjects to a certain amount the TiHo implemented the so-called practical year in 2004. For one semester students have the possibility of experiencing an orientation phase gathering experience for their individual career decision. They can choose the clinic in which they want to have the main part of their practical training. A track was created for paraclinical training (research, food hygiene) for students who are more interested in a research career or veterinary public health with reduced clinical training.

In the curriculum as regulated by the TAppV, teaching and examinations are divided into two preclinical and one clinical section:

- **First preclinical examination** (Vorphysikum) – scheduled during the first year, covering physics, chemistry, zoology, botany
- **Second preclinical examination** (Physikum) – scheduled during the second year, covering basic subjects such as anatomy, histology and embryology, physiology, biochemistry, animal breeding and genetics
- **Clinical examinations** (Staatsexamen) – covers virology, bacteriology and mycology, parasitology, animal nutrition, animal hygiene and husbandry, clinical subjects (internal medicine, surgery, clinical radiology of the different species), diseases of poultry, pathology, reproduction, as well as pharmacology and toxicology, food hygiene and legal knowledge of subjects such as food hygiene (meat, milk, other animal foods), animal welfare, state veterinary medicine, pharmaceutical law, by-laws covering anaesthetics and veterinary legislation (see description of examinations).

These subjects have to be taught as regulated by the TAppV. The scientific-theoretical part of the studies covers 3,850 hours of obligatory lectures, courses and electives (practical year of 460 hours intramural training included). Students should be on campus for an average of 33 hours per week, allowing time for independent study at home or at university facilities.

Extramural work: In addition, students have to spend 70 hours (2 weeks) on the TiHo-Farm for Education and Research in Ruthe learning about animal genetics and husbandry, milking techniques etc. They must also complete an obligatory extramural part of the studies comprising a total of 1,100 hours. During this time, 850 hours (1 x 4 weeks and 2 x 2 months) are spent in private practice or a TiHo clinic, and 250 hours (2 x 3 weeks, 1 x 2 weeks) in governmental or private institutes concerned with

different aspects of food hygiene (including slaughterhouse hygiene) and consumer protection. These parts of the training have to be taken during the lecture-free time. In the practical year (5th year) students rotate between intramural training (practical semester), training in private practice (selection of another turn of the intramural training as an alternative is possible) and food hygiene (training in a slaughterhouse).

Following the practical year, the final section of the clinical examinations takes place, leading to an average length of study of eleven semesters (5.5 years), which is met by the majority of students.

Further, the TAppV specifies that **electives** (Wahlpflichtveranstaltungen) are to be provided. These are lectures, seminars or practical and clinical courses intended to enhance students' basic knowledge in certain fields which they can choose according to their preferences. Students have to subscribe for 308 hours of such electives and select them on-line using an intranet-accessible program. The electives are classified as **basic subjects, research, food hygiene, aetiology, companion animals and farm animals** to facilitate students' choices and to provide a good orientation for their future career.

4.1.1.2 Types of training

THEORETICAL TRAINING

- **Lectures** convey theoretical knowledge. Lectures are given to an entire or partial annual intake of students. Teaching may be with or without the use of teaching aids or of demonstration animals or specimens. The essential characteristic is that there is no active involvement of the students in the material discussed. They listen and do not act.
- **Seminars** (sometimes called tutorials or supervised group work) are teaching sessions directed towards a smaller group of students during which they work on their own, or as a team, on part of the theory, prepared from manuscript notes, photocopied documents, articles and bibliographic references. Information is illustrated and knowledge extended by the presentation of audio-visual material, exercises, discussions and, if possible, case work.
- **Self-directed learning** are sessions of individual students making use of defined teaching material provided by the Faculty (eg e-learning)

SUPERVISED PRACTICAL TRAINING

- **Laboratory and desk-based work.** Includes teaching sessions where students themselves actively perform laboratory experiments, use microscopes for examination of histological or pathological specimens. It also includes work on documents and idea-formulation without the handling of animals, organs, objects or products (e.g. essay work, clinical case studies, handling of herd-health monitoring programmes, risk-assessment computer-aided exercises).
- **Non-clinical animal work.** These are teaching sessions where students themselves work on normal animals, on objects, products, carcasses etc. (e.g. animal husbandry, ante mortem and post mortem inspection, food hygiene, etc.) as well as performing dissection or necropsy.

- **Clinical work.** These are strictly hands-on procedures by students which include work on normal animals in a clinical environment, on organs and clinical subjects including individual patients and herds and making use of the relevant diagnostic data. Surgery or propaedeutical hands-on work on organ systems on cadavers to practise clinical techniques are also classified as clinical work.

Training is provided in all categories. Teachers give as far as possible seminars, laboratory and desk-based work, non-clinical animal work and clinical work (see table 4.1). Self-directed learning is possible at different points in time for each student almost daily. Due to high student numbers practical classes are repeated several times and not every student has obligatory work to do during day-time schedules. During this time self-directed learning is expected and defined e-learning programs or other materials are provided (see chapter on e-learning and library). Obligatory case reports have to be written and are controlled and discussed with teachers. It is in the nature of such self-directed studies in the university with a fully regulated national curriculum that time, contents, and intensity of such studies is individual with the exception of obligatory case report writing.

4.1.2 UNDERGRADUATE CURRICULUM FOLLOWED BY ALL STUDENTS

4.1.2.1 Curriculum hours

In the national curriculum (TappV) self-directed learning is not obligatory. However, some teachers already offer a few self-directed classes and report writing as controlled self directed learning measurement is obligatory. According to EU regulations on BSc and MSc, 1,800 hours per year contact hours and self-directed learning are mandatory. In diploma supplements and in the ECTS-system, rules exist for self-directed learning as a preparation for classes and examinations. Therefore, we provide two different kinds of tables: one according to the TAppV (table 4.1A und 4.2A) and one according to the ECTS-system and our diploma supplements (table 4.1B and 4.2B).

Table 4.1A: General table of curriculum hours taken by all students (**TAppV**)

Year	Hours of training							Other (G)	Total
	Theoretical training		Self-directed learning (C)	Supervised practical training					
	Lectures (A)	Seminars (B)		Laboratory and desk-based work (D)	Non-clinical animal work (E)	Clinical work (F)			
First	473	8		123	145			749	
Second	420	1		219	97	79	2	818	
Third	464	44	8	142	21	217		896	
Fourth	611	38	5	64	52	150	77	997	
Fifth						460 + 850	250	1560	
Sixth	Exams								
Total	1968	91	13	548	315	906 + 850	329	5020	

Table 4.1B: General table of curriculum hours taken by all students (**ECTS**)

Year	Hours of training							Other (G)	Total
	Theoretical training		Self-directed learning (C)	Supervised practical training					
	Lectures (A)	Seminars (B)		Laboratory and desk-based work (D)	Non-clinical animal work (E)	Clinical work (F)			
First	473	8	1051	123	145			1800	
Second	420	1	982	219	97	79	2	1800	
Third	464	44	912	142	21	217		1800	
Fourth	611	38	808	64	52	150	77	1800	
Fifth			240			460+ 850	250	1800	
Sixth	exams							0	
Total	1968	91	3993	548	315	1756	329	9000	

Curriculum

Table 4.2A: Curriculum hours in EU-listed subjects taken by each student (**TAppV**)

Subject	Theoretical training			Supervised practical training			Other	Total
	Lectures A	Seminars B	Self directed learning C	Laboratory and desk based work D	Non-clinical animal work E	Clinical training F		
1. Basic subjects								
a) Physics	48			8				56
b) Chemistry	81			24				105
c) Animal biology	30			26				56
d) Plant biology	28			28				56
e) Biomathematics	28							28
<i>1- Total number of hours</i>	215			86				301
2. Basic sciences								
a) Anatomy (incl. histology and embryology)	140			42	140			322
b) Physiology	90			78				168
c) Biochemistry, cellular and molecular biology	84			28				112
d) Genetics (including molecular genetics)	22			21	11			54
e) Pharmacology and pharmacy	74			42				116
f) Toxicology (including environmental pollution)	24	7	7					38
g) Microbiology (including virology, bacteriology and mycology)	72			52				124
h) Immunology	26	16		6				48
i) Epidemiology (including scientific and technical information and documentation methods)	34			4				38
j) Professional ethics, see 6.								
<i>2- Total number of hours</i>	566	23	7	273	151			1020

Table 4.2A: Curriculum hours in EU-listed subjects taken by each student (TAppV) (continued)

Subject	Theoretical training			Supervised practical training			Other	Total
	Lectures	Seminars	Self directed learning	Laboratory and desk based work	Non-clinical animal work	Clinical training		
	A	B	C	D	E	F		
3. Clinical Sciences								
a) Obstetrics	12					64		76
b) Pathology including pathological anatomy	98	35	5	4	36		4	182
c) Parasitology				56				56
d) Clinical Medicine	111					180		291
e) Clinical lectures on various domestic animal, poultry and other animal species	45	6	1	4	1	51		108
e) Surgery (including anaesthetics)	69					220		289
f) Preventive Medicine	27				1	62		90
g) Diagnostic Imaging (including radiology)	62			4		82		148
h) Field veterinary medicine (ambulatory clinics)						68		68
i) Reproduction and Reproductive Disorders	32			12		44		88
j) Veterinary state medicine and public health	30					12		42
k) Veterinary legislation and forensic medicine	42							42
l) Therapeutics	69					20		89
m) Propaedeutics (including laboratory diagnostic methods)	56	1		33		79	2	171
3- Total number of hours	653	42	6	113	38	882 + 850 (extra-mural)	6	1740 + 850 (extra-mural)
4. Animal Production								
a) Animal production	74	8		30	30			142
b) Animal nutrition	56	6		2	16			80
c) Agronomy	22				40			62
d) Rural economics	14				5			19
e) Animal husbandry	40							40
f) Veterinary hygiene	46				5			51
g) Animal ethology and protection	84							84
4- Total number of hours	336	14		32	96			478

Curriculum

Table 4.2A: Curriculum hours in EU-listed subjects taken by each student (**TAppV**)
(continued)

Subject	Theoretical training			Supervised practical training			Other	Total
	Lectures	Seminars	Self directed learning	Laboratory and desk based work	Non-clinical animal work	Clinical training		
	A	B	C	D	E	F		
5. Food hygiene/ Public Health								
a) Inspection and control of animal foodstuffs or foodstuffs of animal origin and the respective feedstuff production unit	54						8	62
b) Food hygiene and technology	35	12		40	30		16	133
c) Food science including legislation	37						75	112
d) Practical work (including practical work in places where slaughtering and processing of foodstuffs takes place)				4			224	228
<i>5- Total number of hours</i>	<i>126</i>	<i>12</i>		<i>44</i>	<i>30</i>		<i>323</i>	<i>535</i>
6. Professional knowledge								
a) Practice management	2					12		14
b) Professional ethics	14							14
c) Veterinary certification and report writing	14					12		26
d) Veterinary legislation	28							28
e) Career planning and opportunities	14							14
<i>6- Total number of hours</i>	<i>72</i>					<i>24</i>		<i>96</i>
Total	1986	91	13	548	315	906 + 850 (extra mural) = 1756	329	4170 + 850 (extra mural) = 5020

Table 4.2B: Curriculum hours in EU-listed subjects taken by each student (ECTS)

Subject	Theoretical training			Supervised practical training			Other	Total
	Lectures	Seminars	Self-directed learning	Laboratory and desk-based work	Non-clinical animal work	Clinical training		
	A	B	C	D	E	F	G	
1. Basic subjects								
a) Physics	48		64	8				120
b) Chemistry	81		255	24				360
c) Animal biology	30		94	26				150
d) Plant biology	28		94	28				150
e) Biomathematics	28		32					60
<i>1- Total number of hours</i>	<i>215</i>		<i>539</i>	<i>86</i>				<i>840</i>
2. Basic sciences								
a) Anatomy (incl. histology and embryology)	140		488	42	140			810
b) Physiology	90		402	78				570
c) Biochemistry, cellular and molecular biology	84		308	28				420
d) Genetics (including molecular genetics)	22		96	21	11			150
e) Pharmacology and pharmacy	74		124	42				240
f) Toxicology (including environmental pollution)	24	7	59					90
g) Microbiology (including virology, bacteriology and mycology)	72		146	52				270
h) Immunology	26	16	48	6				90
i) Epidemiology (including scientific and technical information and documentation methods)	32		24	4				60
j) Professional ethics								
<i>2- Total number of hours</i>	<i>564</i>	<i>23</i>	<i>1695</i>	<i>273</i>	<i>151</i>			<i>2700</i>

Curriculum

Table 4.2B: Curriculum hours in EU-listed subjects taken by each student (**ECTS**)
(continued)

	Subject	Theoretical training			Supervised practical training			Other	Total
		Lectures	Seminars	Self directed learning	Laboratory and desk based work	Non-clinical animal work	Clinical training		
		A	B	C	D	E	F	G	
3.	Clinical Sciences								
	a) Obstetrics	12		74			64		150
	b) Pathology including pathological anatomy	98	35	153	4	36		4	330
	Parasitology			34	56				90
	d) Clinical Medicine	111		158			180		450
	e) Clinical lectures on various domestic animal, poultry and other animal species	45	6	103	4	1	51		210
	e) Surgery (including anaesthetics)	69		67			220		360
	f) Preventive Medicine	27		30		1	62		120
	g) Diagnostic Imaging (including radiology)	62		62	4		82		210
	h) Field veterinary medicine (ambulatory clinics)			22			68		90
	h) Reproduction and Reproductive Disorders	32		62	12		44		150
	i) Veterinary state medicine and public health	30		48			12		90
	j) Veterinary legislation and forensic medicine	42		48					90
	k) Therapeutics	69		61			20		150
	l) Propaedeutics (including laboratory diagnostic methods)	56	1	69	33		79	2	240
	<i>3- Total number of hours</i>	<i>653</i>	<i>42</i>	<i>991</i>	<i>113</i>	<i>38</i>	<i>882 + 850 (extra mural)</i>	<i>6</i>	<i>2730 + 850 (extra mural)</i>
4.	Animal Production								
	a) Animal production	76	8	95	30	30			240
	b) Animal nutrition	56	6	100	2	16			180
	c) Agronomy	22		58		40			120
	d) Rural economics	14		11		5			30
	e) Animal husbandry	40		20					60
	f) Veterinary hygiene	46		69		5			120
	g) Animal ethology and protection	84		66					150
	<i>4- Total number of hours</i>	<i>338</i>	<i>14</i>	<i>419</i>	<i>32</i>	<i>96</i>			<i>900</i>

Table 4.2B: Curriculum hours in EU-listed subjects taken by each student (**ECTS**)
(continued)

Subject	Theoretical training			Supervised practical training			Other	Total
	Lectures	Seminars	Self directed learning	Laboratory and desk based work	Non-clinical animal work	Clinical training		
	A	B	C	D	E	F		
5. Food hygiene/ Public Health								
a) Inspection, and control of animal foodstuffs or foodstuffs of animal origin and the respective feedstuff production unit	54		28				8	90
b) Food hygiene and technology	35	12	107	40	30		16	240
c) Food science including legislation	37		68				75	180
d) Practical work (including practical work in places where slaughtering and processing of foodstuffs takes place)			42	4			224	270
<i>5- Total number of hours</i>	<i>126</i>	<i>12</i>	<i>245</i>	<i>44</i>	<i>30</i>		<i>323</i>	<i>780</i>
6. Professional knowledge								
a) Practice management	2		16			12		30
b) Professional ethics	14		31					45
c) Veterinary certification and report writing	14		24			12		50
d) Veterinary legislation	28		17					45
e) Career planning and opportunities	14		16					30
<i>6- Total number of hours</i>	<i>72</i>		<i>104</i>			<i>24</i>		<i>200</i>
Total	1968	91	3993	548	315	906 + 850 (extra-mural) = 1756	329	8150 + 850 (extra-mural) = 9000

Curriculum

The following table provides the distribution of the teaching hours and subjects according to the TiHo curriculum without distribution in EU subjects.

4.2C: Curriculum hours of the TiHo in accordance with the 1-10 Semesters Time-tables

Semester	1	2	3	4	5	6	7	8	9-10	
Subject	hours / semester									
1	56									56
2	61	44								105
3	56									56
4	28	28								56
5				28						28
6	28	14								42
7	84	36	84	20						224
8		36	28	34						98
9	14	14								28
10	28									28
11	28			28						56
12				14	28					42
13										280
13,1		91	77							
13,2		56	56							
14				42						42
15			42	42						84
16				42	70					112
17			28	28						56
18								14		14
19							56			56
20								28		28
21						14	14			28
22					42	42	42	14		140
23				42	70	70	56			238
24					14	14				28
25					14			28		42
26				56		70	28	28		182
27					35					35
27,1					28	14	14	10		66
27,2						35	14	14		63
27,3						35	14	28		77
27,4								42		42
27,5						14	14	28		56
30								22	20	42
31					28	42	56	70		196
32,1						112	84	28	352	576
32,2									32	32
32,5					32					32
32,6						12	12	12	14	50
34							56	70		126
39	21	21	21	21	42	42	42	56	42	308
Total	404	340	336	397	403	516	502	492	460	3850

ELECTIVE SUBJECTS

Courses are announced by the individual teacher at the beginning of each semester. Within the scope of each subject, the topics and titles of the elective courses may change every semester. Students have to take elective subjects amounting to 308 hours. According to the TAppV 84 hours have to be taken in basic subjects and sciences, 126 hours in clinical sciences or food hygiene/public health. The remaining 98 hours can be chosen by each individual student, being seen as an orientation phase for their future profession. Electives are mostly taught on Wednesday and Friday afternoons to facilitate students' choices. Students select these electives on-line using an intranet-accessible program. The electives are classified as **basic subjects, research, food hygiene, aetiology, companion animals and farm animals.**

The size of the group depends on the amount of practical, clinical and/or laboratory work. The average group size is 20 - 30. In some instances groups are smaller than 10 or larger than 30. Most elective subjects provide problem-based learning and integrate basic subjects and sciences with clinical subjects (See Annex 4).

Table 4.3: Curriculum hours in EU-listed subjects offered and to be taken as electives

Subject	Theoretical training		Supervised practical training			Other	Hours to be taken by each student per subject group		
	Seminars	Self - directed learning	Laboratory and desk-based work	Non-clinical animal work	Clinical work				
	A	B	C	D	E	F			
Basic subjects							84	98 (freely chosen)	
Basic sciences									
Clinical sciences							126		
Animal production									
Food hygiene/ Public health									
Professional knowledge									
Total	308 hours								

Orientation phase in the practical year

In addition to the compulsory electives an orientation phase was introduced at the TiHo in the final year (practical year) in order to integrate the students more intensively in the clinical and scientific reality of life. The practical year includes the 9th and 10th semester and acts as a transition between the tightly organised course of study and career afterwards. It includes extramural practicals and an internal practical semester, which can be completed during the whole year in the clinics or institutes of the TiHo. This intramural educational cycle includes 460 hours of clinical training and takes place in 10-week cycles at the animal species clinics (horse, cattle, small ruminants and pigs, small animals) or in paraclinical institutes. Since in the later career activity is not only clinically oriented and since there is a need for veterinarians interested in working in paraclinical fields, interested students are given the opportunity of completing a training cycle in paraclinical subjects. About 10% of students take up this offer. A further ca. 10% of students voluntarily do a second cycle of the practical semester at the TiHo, which can partly replace the extramural practicals. A fixed time-table for the training cycles has been introduced in the respective clinics. This includes predominately practical work, but also seminars, journal clubs, interdisciplinary teaching, radiology rounds etc. Similar programs were developed in the paraclinical institutes.

Somewhat differently depending on the animal species clinic the students have to work through a compulsory catalogue which includes clinical training in various wards (e.g. internal medicine, intensive care, surgical suites, orthopaedics, anaesthesia, reproduction medicine, laboratory medicine, dermatology, behavioural consulting, oncology, cardiology, neurology, imaging techniques, blacksmith, mobile clinic, herd health management, epidemiology etc.). The students are encouraged during problem orientated teaching to make differential diagnoses independently by literature research according to the ideas of an evidence based medicine, have to compile written medical reports and learn to converse appropriately with the pet owner. These communication skills can be extended on a voluntary basis by way of a weekend seminar. Dividing up of the students in the practical year, exceptionally small group teaching (1-2 students/rotation on a ward) is possible.

The efficiency of this semester is checked with the help of a computerised feed-back system (PowerVote, formative assessment). On the final day of a cycle students answer multiple-choice questions which derive from the daily clinic life of patient treatment with the aid of this system.

A training cycle can also be carried out as desired at a paraclinical organisational unit. Students should be encouraged to be increasingly interested in the work of the institutes and the subjects of food hygiene. The following subjects can be intensively studied over a 10-14 week period: pathology, pharmacology, food hygiene subjects, physiology, animal nutrition, immunology, biochemistry, animal breeding or an "infection medical semester". Students are supervised by the scientific personnel of

the Institute in carrying out experiments and trained in keeping records, evaluating experiments and dealing with scientific literature.

4.1.3 RATIOS

As indicated in tables 4.1 to 4.3, the figures for the denominators are defined as follows:

Figure	Total no. teaching hours	TAppV	ECTS
A	Lectures	1968	1968
B	Seminars	91	91
C	Self-directed learning	13	3993
D	Laboratory and desk-based work	548	548
E	Non-clinical animal work	315	315
F _I	Clinical work, intramural	906	906
F _T	Clinical work, Total	1756	1756
G	Other	329	329

For A (TAppV, 4.1A, 4.2A):

$$R6_{\text{Intra, TAppV}} = \frac{\text{Theoretical training (A+B+C)}}{\text{Supervised practical training (D+E+F}_I)} = \frac{2,072}{1,769} = \frac{1}{0.85}$$

$$R6_{\text{Total, TAppV}} = \frac{\text{Theoretical training (A+B+C)}}{\text{Supervised practical training (D+E+F}_T)} = \frac{2,072}{2,619} = \frac{1}{1.26}$$

$$R7_{\text{Intra, TAppV}} = \frac{\text{Clinical Work (F}_I)}{\text{Laboratory and desk-based work + non-clinical animal work (D +E)}} = \frac{906}{863} = \frac{1}{0.95}$$

$$R7_{\text{Total, TAppV}} = \frac{\text{Clinical Work (F}_T)}{\text{Laboratory and desk-based work + non-clinical animal work (D +E)}} = \frac{1,756}{863} = \frac{1}{0.49}$$

Curriculum

$$\begin{array}{l}
 \text{Self-directed learning} \\
 \text{(C)} \\
 \hline
 \text{Teaching load} \\
 \text{(A+B+C+D+E+F}_I\text{+G)}
 \end{array}
 = \frac{13}{4,170} = \frac{1}{321}$$

R8_{Intra, TAppV}

$$\begin{array}{l}
 \text{Self-directed learning} \\
 \text{(C)} \\
 \hline
 \text{Teaching load} \\
 \text{(A+B+C+D+E+F}_T\text{+G)}
 \end{array}
 = \frac{13}{5,020} = \frac{1}{386}$$

R8_{Total, TAppV}

For B (ECTS, 4.1B, 4.2B):

$$\begin{array}{l}
 \text{Theoretical training} \\
 \text{(A+B+C)} \\
 \hline
 \text{Supervised practical training} \\
 \text{(D+E+F}_I\text{)}
 \end{array}
 = \frac{6,052}{1,769} = \frac{1}{0.29}$$

R6_{Intra, ECTS}

$$\begin{array}{l}
 \text{Theoretical training} \\
 \text{(A+B+C)} \\
 \hline
 \text{Supervised practical training} \\
 \text{(D+E+F}_T\text{)}
 \end{array}
 = \frac{6,052}{2,619} = \frac{1}{0.43}$$

R6_{Total, ECTS}

$$\begin{array}{l}
 \text{Clinical Work} \\
 \text{(F}_I\text{)} \\
 \hline
 \text{Laboratory and desk-based work} \\
 \text{+ non-clinical animal work} \\
 \text{(D +E)}
 \end{array}
 = \frac{906}{863} = \frac{1}{0.95}$$

R7_{Intra, ECTS}

$$\begin{array}{l}
 \text{Clinical Work} \\
 \text{(F}_I\text{)} \\
 \hline
 \text{Laboratory and desk-based work} \\
 \text{+ non-clinical animal work} \\
 \text{(D +E)}
 \end{array}
 = \frac{1,756}{863} = \frac{1}{0.49}$$

R7_{Total, ECTS}

Curriculum

- Clinical training with examinations of the animals, diagnostic procedures, surgery; these problem orientated case discussions are held three days/week for two hours for students of the third and fourth years; group size: about 50 students; in these classes each day 4-6 students, supervised by a teacher examine patients (2 students/animal) and discuss clinical findings, laboratory results, imaging techniques within the group. All students receive a patient in this class (group size 2 students). They have to examine these patients (self-directed learning), write a report about their findings and discuss their findings and the report with teachers. Students have an obligatory rotation in these classes through all species orientated clinics including reproduction and poultry. This rotation takes place from the 6th to the 8th semester (in total 224 hours, a 2 hour class/day).
- Courses in surgery and reproduction in the clinics dealing with farm animals are held in the 7th semester.
- Students have to participate in the activities of the mobile clinics (see Ambulatory Services of the Clinic for Swine, Small Ruminants and Forensic Medicine and of the Clinic for Poultry) for 15 hours (included in Table 4.2) in the 4th year (2- 6 students/group).
- In the 5th year all students are in the so-called practical year and have 460 hours of clinical training in a species orientated clinic chosen by the student (see description of the practical year). A group of 12-20 students/clinic are assigned to a 10 week internal education program. A rotation (1-2 students in one group) is performed for the different subjects (internal medicine, cardiology, imaging, surgery, anaesthesia, neurology, dermatology, herd health management etc). The students spend the whole day in the clinics, are involved in the daily patient management, have their own students' consultation room for primary case responsibility, are involved in the emergency service during nights and weekends (1 night shift every week, 1 weekend for a 10 week education cycle) and in the mobile clinic, have surgery classes and different seminars to provide case orientated teaching on cases seen in the clinics during the day or learn special techniques (e.g. ultrasonography, electrodiagnostics etc). This rotation accounts for 460 hours.
- In addition students (2nd- 4th year) are encouraged to participate in the emergency (24-hour) and hospitalisation activities in the clinics and join the activities of the students already in the practical year (5th year).
- A group of approximately 40 students are hired by the different clinics for a small salary to support the clinic staff by working regularly one night/week and/or at the weekends.

- Students are encouraged to participate in the activities of the special herd health services offered as an elective subject by the Clinic for Swine, Small Ruminants and Forensic Medicine (cattle, swine, small ruminants), by the Clinic for Cattle, the Clinic for Poultry and by the Field Station for Epidemiology in Bakum (swine).
- During the obligatory course at the Farm for Education and Research in Ruthe students are confronted with the routine work in the care and handling of food-producing animals (dairy cows, sows for pig production, laying hens, turkeys, broilers and ducks). Furthermore, the students receive instruction in veterinary measures necessary for evaluating and defining housing and feeding conditions (such as measuring air quality within stables, feeds and feeding quality; monitoring water supply techniques; prophylactic treatments such as vaccination; and hygiene management). Finally, computer-based management systems for cows, sows, and poultry that are widely used in modern livestock production are demonstrated to the students.

For these purposes the practical work of the students is supplemented on each day of the course for about five to six hours in which members of the staff of the various clinics and institutes demonstrate the measures, techniques and skills necessary for practitioners involved in modern herd health management, so that students are exposed to the sum of knowledge from different clinical and aetiological disciplines.

Attendance is not checked in lectures; in all practical and clinical classes attendance is verified by calling students by name or having them sign attendance cards to confirm regular participation. Attendance in 75% of classes is required for confirmation that the course was attended regularly. In addition, successful participation is confirmed by continuous assessment or by having students give brief talks, discuss papers, write case reports (Krankenbericht) or present patients. In the practical year students keep their portfolios.

The following gives a brief overview of times of different subjects:

Basic subjects and sciences

Classes in biology (zoology) are given in the first semester; plant biology in the first and second semester and include practical courses and lectures. Botany focuses on plants used to feed animals and toxic plants and practicals are mostly performed in summer terms in order to visit pastures etc.

Curriculum

Biophysics is also given in the first semesters (lecture, practical work in small groups) and specialises in the physics of electrodiagnostics (e.g. ECG) and imaging techniques (radiology and ultrasonography).

Chemistry is taught in the first year. The first semester contains lectures, a seminar and practical courses in inorganic and bioinorganic chemistry. Organic chemistry is taught in the second semester with lectures, seminars and practical courses. For students who do not have a lot of experience in chemistry from school work, the Institute offers a crash course before the studies.

Anatomy is taught for 4 semesters, lectures and dissection courses are supplemented with slide projections and video demonstrations and integrated teaching with clinicians. In the first year, the focus is on the anatomy of the body systems, while the emphasis is on topographic anatomy in the second year. Functional and applied clinical anatomy forms a substantial part of all of these anatomy classes.

Histology is taught in the first 2 years and comprises classes in which lectures are integrated in the practical courses. Embryology is covered by lectures in the third semester.

Classes in physiology are given in the first and second year (2nd and 3rd semester) with lectures and practical courses. This occurs in close consultation with the Institute for Biochemistry.

Biochemistry and molecular biology are taught in the first and second year of the curriculum (2nd and 3rd semester); lectures include principles of biochemical macromolecules, biochemical pathways, pathological mechanisms and molecular biology. In addition, practical courses are given in the third semester as a module.

Genetics is primarily taught in the third and fourth semesters. In the third semester the basic principles of animal breeding, conservation of breeds, population genetics, cytogenetics and molecular genetics are presented as a lecture (3 hours per week). In the fourth semester, three hours per week are given alternating as seminars and practical courses (selection of animals for performance and health traits, eradication programs for inherited anomalies and diseases and population development in regard to inbreeding and effective population size, judgements of external traits in dogs, pigs, sheep, goats, dairy cattle, beef cattle and horses).

Biostatistics is a two-hour class including practical exercises in the 4th semester.

Epidemiology is given in the 5th and 8th semesters together with veterinary public health.

Microbiology is primarily taught from the fourth to the 7th semester with lectures and practical courses; lectures are given together with general virology, immunology and

parasitology to give a comprehensive overview of infection medicine. The practical course integrates microbiology, diagnostic immunology and virology. Special immunology and clinical immunology are given in the fifth and in the sixth semester (lectures and seminars). Special virology is given in the sixth semester (3 hours, lecture), and special parasitology in the seventh semester (practical course).

Pharmacology and toxicology are taught in the fifth and sixth semesters of the curriculum. Drug law is taught in the seventh semester and a practical course in pharmacy is given in the seventh semester. In the 8th semester a class on clinical pharmacology takes place.

Clinical sciences

Pathology starts in the second year (4th semester) of the curriculum. General pathology (including principles of degenerative, inflammatory, neoplastic, genetic and immunopathological diseases) is taught in the 4th semester in lectures and as a small-group seminar. Special pathology is taught in lectures and seminars according to the different organ systems in the sixth and seventh semester. Histopathology courses are given in the sixth semester and post mortem practical courses in the seventh semester. Organ lesions (fresh case material) are demonstrated for students of the 8th semester.

Radiology is taught in the 4th and 5th semester and includes radiation protection. An examination takes place after the 5th semester.

The distribution of the clinical curriculum hours given by the TiHo in the EU-listed clinical subjects is covered by the species-based clinical education in Hannover. The clinical education, already described above, occurs throughout the curriculum with integrated teaching from the 1st semester onwards, intensive education starting with propaedeutics in the 4th semester (parallel to general pathology, microbiology, genetics and animal nutrition) continuing until the 9th and 10th semester with the main focus being on practical training (see practical year). The following subjects are covered: clinical examination and diagnosis, internal medicine including laboratory diagnostics and dietetics, dermatology, cardiology, oncology, gastroenterology, neurology, surgery, orthopaedics, anaesthesia, ophthalmology, diseases of hooves and claws, clinical radiology and imaging techniques, physiology and pathology of reproduction (including diseases of newborns and of the mammary glands), diseases of poultry, diseases of reptiles, amphibians, fish and bees, veterinary public health, zoonoses, ambulatory clinic, herd health medicine.

Participating institutions are: Small Animal Clinic, Clinic for Horses, Clinic for Cattle, Clinic for Swine, Small Ruminants and Forensic Medicine, Institute for Reproductive Medicine, Clinic for Poultry, Institute for Fish Pathology and Fish Farming. For integrated teaching, cooperation with non-clinical institutions is given.

Preventive veterinary medicine is taught by the clinics during ambulatory service (practical work) and in lectures in the Clinic for Cattle and the Clinic for Swine and Small Ruminants; aspects of population-based medicine as well as disease models are taught by the Department of Biometry, Epidemiology and Information Processing. For interested students there is also the option to participate in a one-week course at the Field Station in Bakum during the regular curriculum.

Animal production

Lectures on agronomy (including rural economics) are given in the first year, and the basic knowledge on farm management to be taught is completed with practical work during the mandatory two-week course at the Farm for Education and Research in Ruthe.

Animal nutrition and feeding is taught by the Institute of Animal Nutrition in the fourth and seventh semesters (lectures and practical classes in small groups).

Lectures and practical classes on animal husbandry, animal ethology and protection and laboratory animal medicine are given by the Institutes for Animal Breeding and Genetics, the Institute for Animal Hygiene, Animal Welfare and Behaviour of Farm Animals, and by the Institute of Animal Welfare and Behaviour (pet and laboratory animals and horses), and teaching is spread over the second, third, and fourth years. The TAppV stipulates three exams in these subjects, i.e. "Animal breeding and genetics", "Animal husbandry and animal hygiene" and "Animal welfare".

Food Hygiene

Almost all of food hygiene is taught by members of the Department of Food Sciences, taking place between the 5th and 8th semester. Extramural practical work (e.g. in slaughterhouses) takes place in the practical year.

Food hygiene and technology is taught in the third and fourth years involving coordinated lectures and practical classes in food inspection (particularly animal food products, carcass inspection, inspection of processed animal food products). Furthermore, students have to complete an obligatory 100 hours of extramural training in a slaughterhouse.

In addition, an interdisciplinary class in food hygiene is obligatory for students in the seventh and eighth semester. In this class (196 hours) students are taught by instructors from different disciplines to bring basic, paraclinical and clinical subjects and food hygiene into context and thereby practise problem-based teaching. Further, students are taught specific inspection techniques in electives.

Professional knowledge

A large proportion of the instruction in professional knowledge is covered in the first year by courses in career planning, professional ethics, history of the profession and technical terminology. Veterinary legislation is given in the eighth semesters. Practice management is included in clinical education (practical year) and is given in electives. Students are educated in veterinary report writing in the clinical education starting in the 6th year and have to write at least one case report in each species orientated clinic/semester. In addition, this is taught and performed in the practical year. Career planning is also given for students of the 7th – 11th semester in electives and in addition in afternoon/weekend seminars with national professional associations.

4.1.5 OBLIGATORY EXTRAMURAL WORK

Practical work (Total): 320 hours

Clinical work (Total): 850 hours (can be taken as an intramural rotation)

Table 4.5: Obligatory extramural work that students must undertake as part of their course

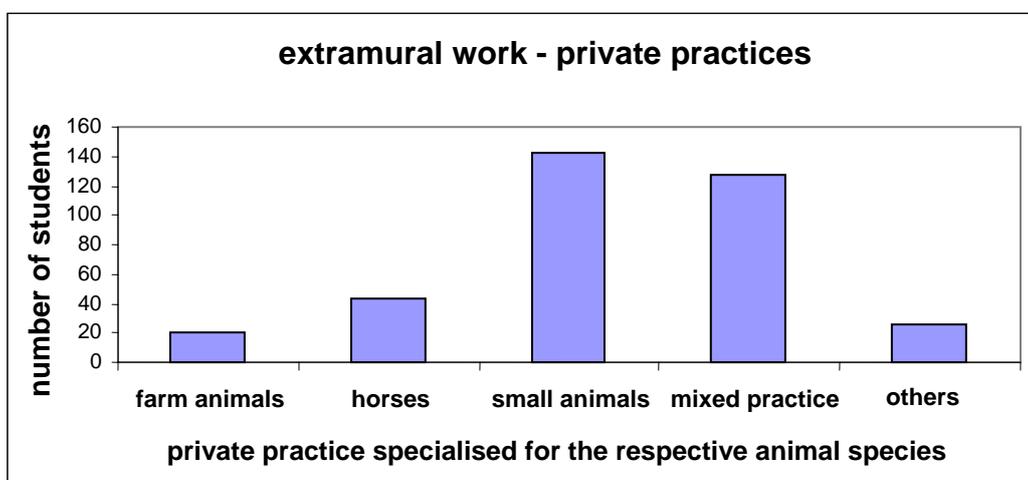
Nature of work	Period	Year of the course in which work is carried out
Agriculture (genetics, husbandry, milking techniques etc.)	70 hours (2 weeks), 1.4 % of total study time	after the 1 st year
Clinical training (private practice or clinic)	150 hours (4 weeks), 3 % of total study time	after the 5 th or 6 th semester or later
Clinical training (private practice and/or clinic) *	700 hours (16 weeks), 14 % of total study time	in the 5 th year (practical year)
Food hygiene	75 hours (3 weeks), 1.5 % of total study time	after the 3 rd year (6 th semester)
Food hygiene (slaughter-house)	100 hours (3 weeks), 2 % of total study time	in the 5 th year (practical year)
Food hygiene	75 hours (2 weeks), 1.5 % of total study time	in the 5 th year (practical year)

* As an option 350 hours (8 weeks) of this practical work can be served in a paraclinical institute, such as microbiology, virology etc., or at a veterinary public health office facility, artificial insemination station, in the pharmaceutical industry, or in a zoo. The figures represent the minimum resp. obligatory period (TAppV). If students stay longer this time is voluntary and is not calculated as obligatory study time.

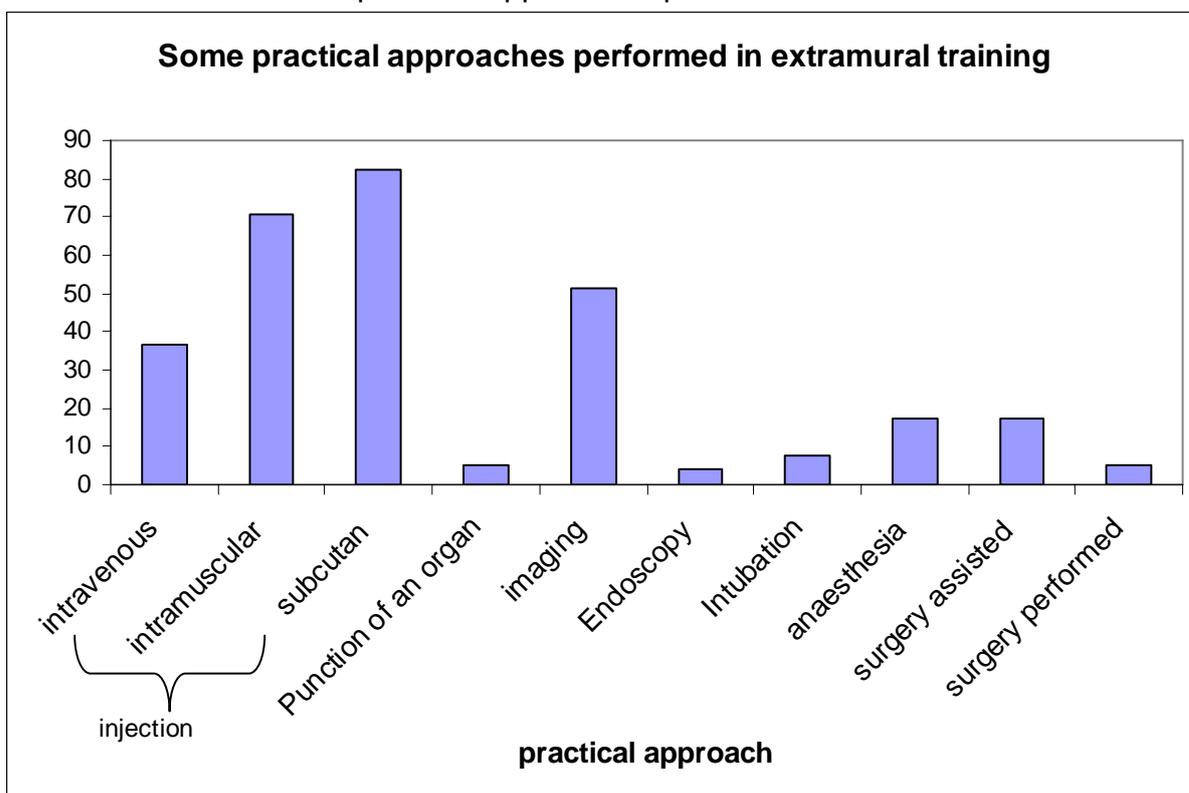
The TiHo organises the practical work (agriculture) done at the Farm for Education and Research in Ruthe. Other extramural work has to be organised by the students. The clinical training can be done with any veterinary surgeon fulfilling the requirements of Article 58 of the TAppV (i.e. who has led an independent practice for at least two years and has a licensed veterinary pharmacy). To help students find a good place for their extramural education the TiHo provides students with a list of positively evaluated private practices, or teachers give advice to individual students.

In addition the TiHo has a good connection to the professional associations (Berufsverbände) and is in ongoing discussion concerning improving clinical training in private practice. The extramural work in a slaughterhouse must be performed in an EU-licensed establishment.

After having completed a section of their extramural training students receive a certificate signed by the veterinary surgeon responsible for their training. Students and veterinary surgeons have to evaluate the practical work (evaluation of the practical work, of the teacher and of the student) and provide data about their training. The TiHo has developed a form with relevant training contents. An example of the evaluation of the extramural work in a private practice is shown in the following graph:



Number of different practical approaches per student:



Extramural work in food hygiene and slaughterhouses is assessed in a similar way (see annex 5).

4.1.6 SPECIFIC INFORMATION ON THE PRACTICAL TRAINING OF FOOD HYGIENE

An in-house facility for the training of students is available in the Institute of Food Quality and Food Safety. In order to obtain suitable material, the TiHo has access to a large number of slaughterhouses in Lower Saxony, from which carcasses can be collected for student teaching in the in-house facilities. The TiHo has a small in-house foodstuff processing unit which provides appropriate access for undergraduate students. A butcher is employed in the Institute of Food Quality and Food Safety to provide professional instruction in the practical aspects of meat processing and sausage production. To obtain additional material for teaching, the Institute maintains close contacts to several food processing companies which regularly provide samples and permit visits by groups of undergraduate students.

The obligatory practical training in food hygiene at the TiHo comprises a practical course organised by the Institute of Food Quality and Food Safety. Students receive 80 hours of practical training in food inspection (food of animal origin), food and meat technology and in the context of the interdisciplinary subjects aimed at problem-oriented teaching with clinicians.

There is obligatory practical training in meat hygiene and inspection in a small inspection hall on the TiHo Bischofsholer Damm campus comprising a meat inspection course. In this course, groups of approximately ten students each undergo training on carcasses and organs of pigs, cattle, sheep, game animals and poultry (24 hours).

In addition to this intramural training, obligatory extramural training periods are supervised by the teachers of the Institute for Food Quality and Food Safety. The lecturers of food hygiene subjects of all German educational institutes have made an arrangement with the slaughterhouses as to what should be taught in a practical training period. These documents are handed out to the students. The following points are considered:

1. Training in control activities, methods and techniques for the food sector (hygiene and food inspection practical)

Length: 75 hours

The practical training period for hygiene monitoring can be carried out in slaughterhouses or food businesses, responsible veterinary authorities, in state inspection departments, in private food inspection laboratories, in food businesses with business owned control laboratory, in specialist university units. The supervisors employed full-time in the above named establishments for the control activity, food

monitoring or inspection are veterinary surgeons or other qualified staff. The students should learn the following (examples):

- Assessment of hygiene conditions on premises and facilities
- Methods for controlling the hygiene status
- Assessment of processing and manufacturing technology
- Monitoring or examining various foods
- Assessment of marketability of food
- Food technology
- Quality assurance

2. Training in public veterinary service (practical training period in veterinary service)

Length: 75 hours

The practical training period can be carried out in departments of veterinary administration, veterinary regulatory agency and food regulatory agency, veterinary service sector in state or federal state ministry. The students complete the following teaching content (according to the main focus of the authority, examples):

Main focus “food”

- Familiarisation with structure and tasks of a veterinary office including basic legal principles
- hygiene control in food businesses
- Recognising shortcomings/deficits and official measures (sanctions, fines etc.)

Main focus „Animal Welfare“

- Overview of tasks of veterinary authorities in implementing the animal welfare law
- Granting approval in accordance with § 11 Animal Welfare Law (animal shelters, boarding facilities, zoos, animal exchanges, pet shops, commercial animal husbandry, commercial places to view animals)
- Control of agricultural animal husbandry, authorised companies in accordance with § 11
- Cooperation in implementing regulations on dangerous dogs
- Transport controls and examining transportability
- Permission for animal experiments
- Involvement in Consumer-Committee (CC-) – controls.

Main focus “livestock epidemic controls”

- Essentials of state measures on livestock epidemic controls (e.g. combating leucosis, brucellosis, BHV1, ESP-monitoring etc.)
- Animal epidemic news system (TSN)
- Working with TRACES (import, export of animals or animal products within EU and with third party countries)
- Import of animals (EU-domestic animals identity card)

- Control of institutions for disposal of animal bodies
- Management of livestock epidemic outbreaks
- Compensation, financial aid: managing applications
- Control of livestock (e.g. livestock transportation regulation, pig farming hygiene regulation).
- Carrying out diagnostics of animal diseases
- Issuing of health certificates by veterinary authority

Main focus “Monitoring veterinary drugs“

- Control of in-house pharmacy
- Monitoring of veterinary drugs manufacture and trade
- Special-purpose drug law controls in agricultural businesses
- Implementing the data bank “Vetidata”

Miscellaneous

- Getting to know the quality management system in veterinary service
- Accompanying the veterinary assistant in taking samples of animal feed
- Cooperating with specialist authorities in the District Office (lower nature conservation authority, protection of species and hunting authorities)
- Agricultural architecture

3. Training in inspection of live animals for slaughter and meat inspection (slaughterhouse practical training period)

Length: 100 hours in a meat inspection authority in a slaughterhouse. The slaughterhouse has to be certified and to have a full-time government official veterinarian responsible for control activities. In the case of exclusive slaughtering of pigs or cattle at least 30 hours practical training period has to be spent in a slaughterhouse with the other respective animal species.

In this case the training contents are (examples):

- Inspection of live animals for slaughter – cattle, pig, possibly other animal species
- Measures following the inspection of live animals for slaughter
- Controlling of animal welfare (transport prior to slaughtering)
- Inspection of meat – cattle, pig, possibly other animal species
- Measures following the inspection of meat, assessing the fitness for human consumption
- Trichinella inspection
- Bacteriological meat examination
- Taking samples (e.g. National Residue Control Plan)
 - Fitness for human consumption labelling
 - Meat hygiene statistics
 - Checking handling of SRM and animal by-products

- Slaughterhouse technology (technology of meat production, processing, storage, classification, intestine processing etc.)
- Hygiene monitoring (premises, equipment, staff, processes, cleaning, disinfection, own control, slaughtering hygiene etc.) in accordance with the principles of good hygienic practice and the HACCP Concept.

Every student is compulsorily involved in the evaluation of the practical in accordance with the joint guidelines from the veterinary educational institutes (see annex 5).

4.2 COMMENTS

We are confident that our curriculum prepares students for their future career. All subjects in which a veterinary surgeon can work – clinics, food hygiene, research and public health are covered by a substantial number of theoretical and practical training hours. The curriculum is based on the national regulations (TAppV) which leaves some freedom to educational institutes to arrange their program (20 % of the number of hours). The curriculum starts with teaching in basic subjects and sciences. Since the TiHo employs its own teachers for the basic subjects a close link to veterinary medicine is guaranteed and facilitates integration with clinical subjects and food hygiene. In the 4th semester clinical subjects start to be taught for 5 semesters. After this education for all students the so-called practical year covers the 5th year. The final semester (11th semester) is dedicated to the final exams. The Central Commission for Curricular Affairs prepares and reviews the curriculum for final decisions of the Senate.

A major development in the curriculum was the implementation of the TAppV, which provides more freedom in the teaching programs than the former national regulations. Due to its implementation and discussions in the responsible ministries the TiHo was able to introduce the practical year in 2004, to reduce some hours in basic subjects, to increase the number of clinical education hours, to relax the strong distribution in basic subjects/sciences and clinical subjects/food hygiene and to start in part an integrated teaching program. The goal in the near future is to enhance the integrated teaching process and review and evaluate the major changes carried out in the last few years.

Lower Saxony is a federal state where agronomy and food animal production are important economic factors. Therefore, besides a strong component of small animal medicine, medicine in farm animals, mobile clinic and herd health medicine are a major focus in TiHo`s teaching system. The TiHo still wants to emphasise this part of education, since there is a strong need for veterinary surgeons in Germany specialising in farm animals.

The Ratios in 4.1.3. are influenced by the TAppV.

4.3 SUGGESTIONS

We are confident that the TiHo curriculum prepares students well for all aspects of veterinary medicine. However, the system is constantly reviewed in order to make minor changes and improvements. Especially, the implementation of more integrated teaching is planned.

In addition, the TiHo is closely following the official reform process of the national curriculum. Experience with the TAppV in its current form and its interpretation by the TiHo will facilitate this national process.

5 TEACHING: QUALITY AND EVALUATION

5.1 FACTUAL INFORMATION

The general subjects comply with the guidelines in the TAppV. Every lecturer prepares the detailed teaching contents for inclusion in a general document.

Continuous on-line evaluations by students take place as a rule during and after every semester. In the annual teaching report amendments to teaching and results of the evaluation are presented. A specially designed portal (StudIS/DozIS) exists for all these applications in the TiHo`s intranet.

5.1.1 THE TEACHING PROGRAM

The imparting of scientific and theoretical basics focuses on teaching contents relevant to veterinary medicine and the theoretical and clinical knowledge is linked as far as possible during the entire training. With this the pre-clinical teaching is integrally designed so that clinically relevant themes are included in the pre-clinical teaching. Co-ordination in teaching occurs in the four Central Commissions for pre-clinical, paraclinical and clinical subjects and biology (Fachkommissionen) and is defined in direct consultation with the lecturers. This is documented in the description of the teaching contents. With this lecturers put the contents of their teaching courses on internally accessible internet pages of the TiHo. Thus, unnecessary repetitions of teaching material are avoided. In exactly the same way the students have access to the system and can inform themselves appropriately about preparation for exams, obligatory enrolling for a course or electives and evaluations of courses. This method of quality assurance for teaching is continuously updated as a living document.

In the TAppV interdisciplinary subjects are stipulated in order to carry out problem-based integrated teaching. Thereby, the teaching contents of the clinic are interlinked with those of the basic subjects and sciences, with particular attention being given to food hygiene/veterinary public health. In special electives clinical themes such as reproduction, infection medicine, mastitis, internal medicine, surgery and pathophysiology are connected with basic subjects in a problem-based way.

Due to the species-based organisation of the TiHo, each clinic teaches core clinical sciences according to table 4.2 for the species it represents.

Interdisciplinary co-ordination takes place in the practical course at the Farm for Education and Research in Ruthe. All subjects related to animal production and food-producing animals are taught using a multidisciplinary approach, beginning at the farm level and reaching as far as potential influences on food quality is concerned. The aetiological disciplines in particular work together with the clinicians for cattle,

swine and poultry to combine their specific knowledge and experience in order to optimise conditions for producing animal food products, including aspects of animal breeding, housing, feeding, animal welfare and risks to food safety such as bacterial contamination or antibiotic residues or resistance.

For introducing an institutional pedagogical approach courses on “professional teaching” are carried out (see below). The technique of problem-based learning is widely implemented at the TiHo.

In order to augment the development and implementation of e-learning (computer supported or internet based learning) at the TiHo within the teaching of students and continuing education an e-learning commission has been appointed and an e-learning adviser taken on. The aims are:

- Improvement of teaching by interactive, up-to-date and high-quality teaching materials
- Creation of possibilities for self-directed learning independent from time and place
- Implementation of blended learning (combination of e-learning and presence teaching)
- Preparation for life-long learning
- Enhancement of interdisciplinary learning
- Direct (personal) control of learning success and state of knowledge (formative and summative assessment)

Meanwhile, the number of digital and multimedia prepared teaching courses is growing. Alongside the distributing of lecture hand-outs via faculty own learning management system StudIS/DozIS, CASUS is implemented for internet-based learning. “CASUS” is a case-orientated multimedial system, which was developed for the training and further education of medical students/doctors. The coordination of its implementation in veterinary medicine has been taken on by the University of Veterinary Medicine, Hannover, Foundation. CASUS can be used not only for learning through clinical cases but also for problem-based learning. The Clinic for Horses and the e-learning adviser offer an elective subject “Arranging CASUS-cases” (peer-to-peer education) for students of the clinical semesters. Groups of four participants each are allocated to clinical cases, which they work on (examination, documentation, literature search, presentation) and discuss with the other groups. As a result several CASUS-cases emerge which can be used again in teaching. This form of electives is also offered together with the Clinic for Cattle and the Institute for Microbiology. The aim is, alongside the theoretical and practical knowledge via

introduced cases to gain insight into the didactics and evidence-based literature search. The response of the students is so positive that a permanent extending of this offer is being worked on.

Moreover, a list of more than 600 learning programs implemented in veterinary medicine – subdivided according to disciplines – is available via the internet pages of the e-learning consultancy (<http://www.tiho-hannover.de/service/elearning/sammlung/sammlung.htm>).

In general the teaching staff recommends standard veterinary textbooks, e-learning programs and course notes. Course notes are provided as hard copies and/or online in Intranet StudIS/DoZIS. More and more areas of lectures are being supported by e-learning programs which are compiled by the institutes with the help of the e-learning adviser, partly in cooperation with other faculties. In the veterinary clinics learning programs are used in the clinical-practical year. The Clinic for Cattle distributes an own CD with learning programs for the self-learning phases to all its course participants.

For the extramural practicals special agreements are made with practitioners, slaughterhouses, state veterinary services and laboratories regarding the subjects and contents of the extramural practical work (see chapter 4 and annex 5). Furthermore, special arrangements exist with farms regarding herd health medicine, epidemiology and mobile clinics to provide access for all students subscribing to the respective courses on farms of economic scale. See Table 7.4.

As a general objective the TiHo guarantees a broad education in all subjects of veterinary medicine with the possibility of a career-orientated phase at the end of the course of study in the practical year. Career orientation is promoted by the offer of electives in the whole course of study.

Teaching quality assurance is performed through courses on “professional teaching”, evaluation from students, a national curriculum, a document on study content, assessments, the Commission for Curricular Affairs and the four Central Commissions for pre-clinical, paraclinical and clinical subjects and biology (Fachkommissionen) (see above).

The learning progress of students in the teaching course is checked during the semester by various forms of tests (e.g. Physiology, Anatomy; formative assessment) and by means of the power-vote-system (e.g. Small Animal Clinic and Clinic for Cattle). Exam contents correspond with the description of teaching contents published in the intranet. The power-vote-system enables the reviewing of learning success of students during the lecture as a read-out of a direct, anonymous feedback is given.

The students are currently examined soon after the teaching courses on the subsequent lecture-free period (state examination regulated according to TAppV. See 5.1.3.).

Knowledge and skills in regard to the day one skills are checked in direct contact between teacher and students in small group teaching, by feedback systems and the various exam measures (e.g. clinical exam with patients).

5.1.2 THE TEACHING ENVIRONMENT

Courses for the improvement of pedagogical and didactic skills are organised by the TiHo. In order to achieve systematic improvement of qualifications in university didactics the TiHo developed the concept of the teaching course “Professional Teaching” in cooperation with the *Competence Centre for University Didactics for Lower Saxony (Kompetenzzentrum Hochschuldidaktik für Niedersachsen)* which is offered exclusively to lecturers at the TiHo. The program is made up of ten one-day seminar modules taking place at intervals of approximately two months on the most important themes from the field of university didactics. Furthermore, the program encourages the participants to apply what they have learned in their teaching practice. They are supported in this by regular coaching sessions (control during regular lectures by teachers of other subjects). In addition to exchanging ideas in the group this form of support offers the possibility of discussing the teaching contents and of adapting them to the special requirements of didactics in veterinary medicine. The teaching course ends after 2 years with the award of a certificate following an examination.

This certification should be seen as a system to reward commitment to teaching excellence and has advantages when applying for a job. Additionally, the students give lecturers marks and verbal feedback in their on-line evaluation.

A first effort to improve and reward excellence in teaching and didactic skills is included in the reform of the professorial salary structure. Since 2003, the salaries of newly appointed university professors in Lower Saxony have included a variable part that is influenced by various factors regarding professional performance. Quality of teaching as evaluated by the students is one of these factors.

Other measures to improve the quality of teaching are described in 5.1.4.

5.1.3 THE EXAMINATION SYSTEM

The TiHo has a central examination policy based on the TAppV. The exam is a state exam regulated for Germany. In undergraduate teaching the examiners are appointed upon suggestion of the TiHo by the local Ministry of Agriculture. Duly execution of all state exams are supervised by two Examination Committees (Preclinic and Clinic; Prüfungsausschuss) established at the TiHo and represented by the two Chairpersons of the Examinations Committees (Prüfungsausschussvorsitzende). Every Institute/Clinic has to provide information on the exam procedures to the Student Affairs Office (Studentensekretariat) and the aforementioned Chairpersons. For oral state exams students form groups of four (maximum five), and examination dates at appropriate intervals according to the TAppV are assigned to these groups by the Student Affairs Office.

The examinations follow the lectures and practicals. There are 3 examination sections: the First Preclinical Examination (Vorphysikum), Second Preclinical Examination (Physikum) and the Veterinary Clinical Examination (Tierärztliche Prüfung). The examinations take place after every semester (2-5 examinations in the lecture-free period).

Table 5:1: Examinations at TiHo

Semester						
WS 1						
	Physics	Zoology				
SS 2						
Preclinical Exam	Chemistry	Botany				
WS 3						
	Physiology	Biochemistry				
SS 4						
Second Preclinical Exam	Anatomy	Histology	Animal Breeding, Genetics	General Pathology		
WS 5						
	Animal Welfare and ethology	Propaedeutics	Microbiology (Bacteriology and mycology)	Radiology	Animal Husbandry	
SS 6						
	Virology	Pharmacology and Toxicology	Patho-Histology			
WS 7						
	Animal Nutrition	Parasitology				
SS 8						
Veterinary Clinical Exam	Pharmacy, Drug and narcotics Laws	Animal Epidemics, epidemiology and preventive medicine	Reproductive Medicine (written exam)	Internal Medicine (written exam)	Surgery (written exam)	
WS 9						
SS 10	Practical Year (maximum 37 weeks intra- and extramural practical training)					
WS 11						
	Special Pathology	Food Science and food hygiene	Meat Hygiene	Milk Hygiene	Poultry Diseases	
	Reproductive Medicine (clinical exam)	Internal Medicine (clinical exam)	Surgery (clinical exam)	Forensic Veterinary Medicine, profess. knowledge		

In the practical year between the 9th and 10th semesters no examinations take place. State exams are sat during lecture-free periods.

In general, oral examinations are held, and several exams include a practical part, or a clinical examination, respectively (see table).

Table 5.2: Forms of Examinations at TiHo

Subject	State exam	Continuous assessment
Physics	Multiple choice (MC)	
Zoology	Oral	Oral
Chemistry	Oral	Written papers and oral
Botany	Oral	
Medical Terminology		Written papers
Physiology	Oral	
Biochemistry	Oral (85%) and practical 15%)	
Anatomy	Oral and practical	Oral and practical
Histology	oral and practical	MC, practical (slides)
Animal Breeding, Genetics	Written papers (short answers 50%), oral (25%), practical (25%)	Written papers
Animal Welfare	Oral	
Propaedeutics	Oral clinical exam (100%)	
Bacteriology and mycology	Oral	
Radiology		MC
Animal Husbandry/ Animal Hygiene	MC	
Diagnostics		Oral
Immunology		Written papers (short answers)
Virology	Oral	
Pharmacology and Toxicology	Oral	
Animal Nutrition	Oral	MC
Parasitology	Oral (66%) and practical (34%)	
Pharmacy, drug and narcotics laws	Oral (70%) and practical (30%)	
Animal Epidemics, Epidemiology and Preventive Medicine	Oral	
Pathology	Oral, practical (necropsy, evaluation of 2 organs and 3 slides), written papers	
Poultry diseases	Oral (66%), practical (34%)	
Reproductive Medicine	MC (40%), oral and clinical exam (60%)	
Internal Medicine	MC (40%), oral and clinical exam (60%)	
Surgery and Anaesthesiology	MC (40%), oral and clinical exam (60%)	
Meat Hygiene	Oral (50%), practical (50%)	
Milk Hygiene	Oral (66%), practical (34%)	
Food Science and Food Hygiene	Oral (50%), practical (50%)	MC, short answers (Interdisciplinary Food Science)
Forensic Veterinary Medicine, professional knowledge	Oral	

Immunology is assessed in continuous written exams, but also in the subjects virology, bacteriology and mycology and parasitology. When examining knowledge in drug and narcotics law the medical preparations act is likewise tested.

In the examination in reproductive medicine gynaecology, andrology, obstetrics, illnesses of the mammary glands, neonatology, biotechnical measures including herd management are included. Surgery and anaesthesiology include in addition eye diseases, dentistry, hoof and claw diseases and orthopaedic shoeing. Clinical exams include a written exam on all animal species to fulfil the criteria of TAppV and to control day one skills and an oral and clinical exam in the clinic chosen for the practical year.

External examiners are used in the Graduate School of Biomedical Sciences (PhD program).

In every undergraduate exam the chairpersons of the Examinations Committee can participate and ask questions. Observers from the competent supervisory authority can be sent at all times. Additionally, representatives of the local State Veterinary Chamber and fellow students (up to 5 students) can attend examinations on request as long as none of the students being examined object. The maximum number of retakes is defined in the TAppV. In general a maximum of two retakes of an examination is allowed. For the second and final retake of undergraduate veterinary exams the attendance of the chairperson of the respective Examination Committee or of the appointed representative is mandatory. On demand of students these regulations also apply for the first retake. Students have to pass the examinations within a certain time; this time can be extended on application by the student only in cases of demonstrable good reasons.

Students in general have to pass an examination before they can start other courses: after the second semester the examinations for the First Preclinical Examination (Vorphysikum) have to be passed before the students begin their third semester. If examinations are not passed the student has to repeat the examinations in the following semester, remaining for the time being in the second semester. Likewise, the examinations for the Second Preclinical Examination (Physikum) have to be passed after the fourth semester before being able to join the following clinical semesters. Registrations for the Second Preclinical Examination (Physikum) have to be received at the latest 1.5 years after passing the First Preclinical Examination (Vorphysikum). Exceptions to the rule have to be submitted by the student to the respective Examination Committee.

5.1.4 EVALUATION OF TEACHING

The quality of teaching is assessed by a TiHo procedure according to the requirements given in the State University Law. An official external evaluation of teaching occurs with the evaluation of the EAEVE.

In the TiHo two questionnaires are distributed to students by the President's Office via the internet, one concerning the general teaching environment and the other concerning individual subjects. The students are obliged to evaluate at least 5 courses before they can register on-line for electives. General evaluations of the course of study at the TiHo and its milieu are submitted. Additionally, individual evaluations of classes and lecturers are performed which are then sent to the lecturers.

Following the evaluation, the results concerning the general teaching climate will be published in the Presidential Report and in the Teaching Report. In exactly the same way the measures and improvements, based on the evaluations, are presented.

5.1.5 STUDENT WELFARE

The students are prepared for zoonoses in the subjects covering infection medicine. In case of an acute hazard (e.g. bird flu) TiHo has a special emergency plan, also to protect students. In general protective clothes are obligatory and supplied by students, in case of practicals in clinics or institutes these are provided by the TiHo.

Facilities provided for students (accommodation, canteen, sports) are run by a public body, Hannover Student Services (Studentenwerk Hannover), which handles the entire organisation and administration of the related facilities of all Hannover universities (i.e., University of Hannover, School of Medicine, University of Veterinary Medicine, School of Music and Theatre). Thus, students have access to all facilities, which are located all over the city.

However, in this section of the report only those facilities that are used mainly by TiHo students are described.

Student accommodation is available in two student halls of residence: Menschingstrasse and Bischofsholer Damm. Both are located near the Bischofsholer Damm Campus (approx. 5-10 minutes' walk to either site). In addition, there is a hall of residence (Schwesternhaus) owned and run by an association of present and former students, which is located directly opposite the entrance to the Bischofsholer Damm Campus.

There are two student canteens (Mensa) offering complete cooked meals for students in the vicinity: Robert-Koch-Platz and TiHo Tower:

Teaching: Quality and Evaluation

The canteen, Robert-Koch-Platz is next to the campus Bischofsholer Damm (5 minutes' walk; on the way to the Menschingstrasse hall of residence). It is open Monday - Friday for lunch, i.e., from 12 p.m. until 2 p.m.; no breakfast or evening meals are served. For lunch, a complete cooked meal is offered with a choice of various hot and cold dishes.

The TiHo Tower canteen is located in the TiHo administration building next to the Bünteweg Campus. It is open from 8.10 a.m. until 2.30 p.m., with sandwiches and snacks on offer in the morning and a choice of various hot and cold dishes for lunch (11.40 a.m. until 2.15 p.m.).

There is also a cafeteria, the Pylorus, on the Bischofsholer Damm Campus that is run privately. It is open from 7 a.m. until 5 p.m. and offers a meal of the day as well as a variety of hot dishes, salads, sandwiches and snacks.

For partnership and exchange programs the TiHo provides an Academic Foreign Affairs Office located in the main building on the Bünteweg Campus. The activities of the Office are discussed and decided on in a Committee for International Affairs. Responsibilities of the Office include providing information and assistance to students wishing to study abroad, and the organisation of exchange programs such as ERASMUS/SOCRATES. Each visiting student from abroad is offered help should he/she encounters any kind of problem. The Office tries to alleviate difficulties which may arise while the newcomer is adapting to his/her new surroundings. Assistance is also offered in dealing with the local authorities.

For sports activities there is one stadium and a sports field located right next to the Robert-Koch-Platz canteen in the vicinity of the Menschingstrasse hall of residence (shared with student sport groups of other Hannover institutions of higher education). Veterinary students are also free to use the main sports facilities located next to the University of Hannover Campus.

At The Student Affairs Office the TiHo offers guidance to students with academic problems. Further, students can consult the Vice-President for Teaching or individual faculty members of their choice (for help with study problems, career development, job selection, personal problems).

For problems not directly related to the course of studies, a male and a female professor serve as the designated student advisers for students seeking help with personal or social problems and who have the desire to talk to someone in utmost confidence. Students are informed of special support offered by Hannover Student Services (Studentenwerk Hannover), where they can receive professional guidance free of charge, e.g., at the Psychological Outreach Clinic, the Welfare Help Desk and the Legal Advice Office.

Female students receive specific assistance from the TiHo's Equal Opportunity Office Representative with special emphasis on problems related to pregnancy and child care.

There is also a strong link to the two student parishes, i.e., the Protestant Student Parish and the Roman Catholic Student Parish, which are members of the circle of Hannover Institutions of Higher Education.

5.2 COMMENTS

The coordination of teaching is satisfying since consultation in the four Central Commissions and among the lecturers occurs regularly. This consultation is partly facilitated by the Vice-President for Teaching. The students are well supervised in spite of their large numbers since teaching courses are repeated and small group teaching is offered the whole year round for students. The quality of the course of study is good since in addition to the broad basis a career-orientated education is provided. The interdisciplinarity throughout the study course is given.

E-learning programs for self directed learning have continuously increased since e-learning consulting has been implemented.

In addition, the evaluation of written examinations has been simplified (introduction of on-line examinations, McSurvey) in order to lighten the load for lecturers thereby enabling them to focus on teaching and research related tasks. This is to be developed further.

The internal evaluation has positive effects. The lecturers on the one hand and the Presidium on the other hand have an insight into the situation and can take steps immediately.

Since the TiHo has its own Institutes which are responsible for research and teaching in basic subjects such as Botany, Zoology, Physics and Chemistry the TiHo has control over these subjects, guaranteeing a veterinary medical connection in the teaching contents.

Examinations in a timely manner after each semester enable the students to study in the period within which a course must be completed. This continuous learning process ensures a proper basis for further studies and helps students to finish their studies after 5.5 years (MNY, standard period of study).

A feedback–system for the students as an interactive teaching tool immediately after a lecture enforces students` concentration and learning capabilities and thus improves the instant learning outcome. It will be further implemented.

5.3 SUGGESTIONS

- Quality management will be further professionalised, e.g. by improvement of student participation in internal evaluations.
- Further professionalisation of e-learning and blended teaching.
- Enforcement of the professional orientation of the students at an early stage of study in order to motivate for targeted selection of the electives for their study and career planning.
- Seminars to improve teachers' didactic skills are successfully implemented and participation should be further encouraged.

6 FACILITIES AND EQUIPMENT

6.1 FACTUAL INFORMATION

6.1.1 PREMISES IN GENERAL

The TiHo is primarily located on two sites approximately 4 km apart. The Bischofsholer Damm Campus is situated 2 km from the town-centre and is connected to the Bünteweg Campus by a tram line and a public road with a cycle track.

In addition, the TiHo maintains its Farm for Education and Research in Ruthe (20 km south of the site Bischofsholer Damm) and the Field Station for Epidemiology in Bakum (approximately 200 km to the north-west).

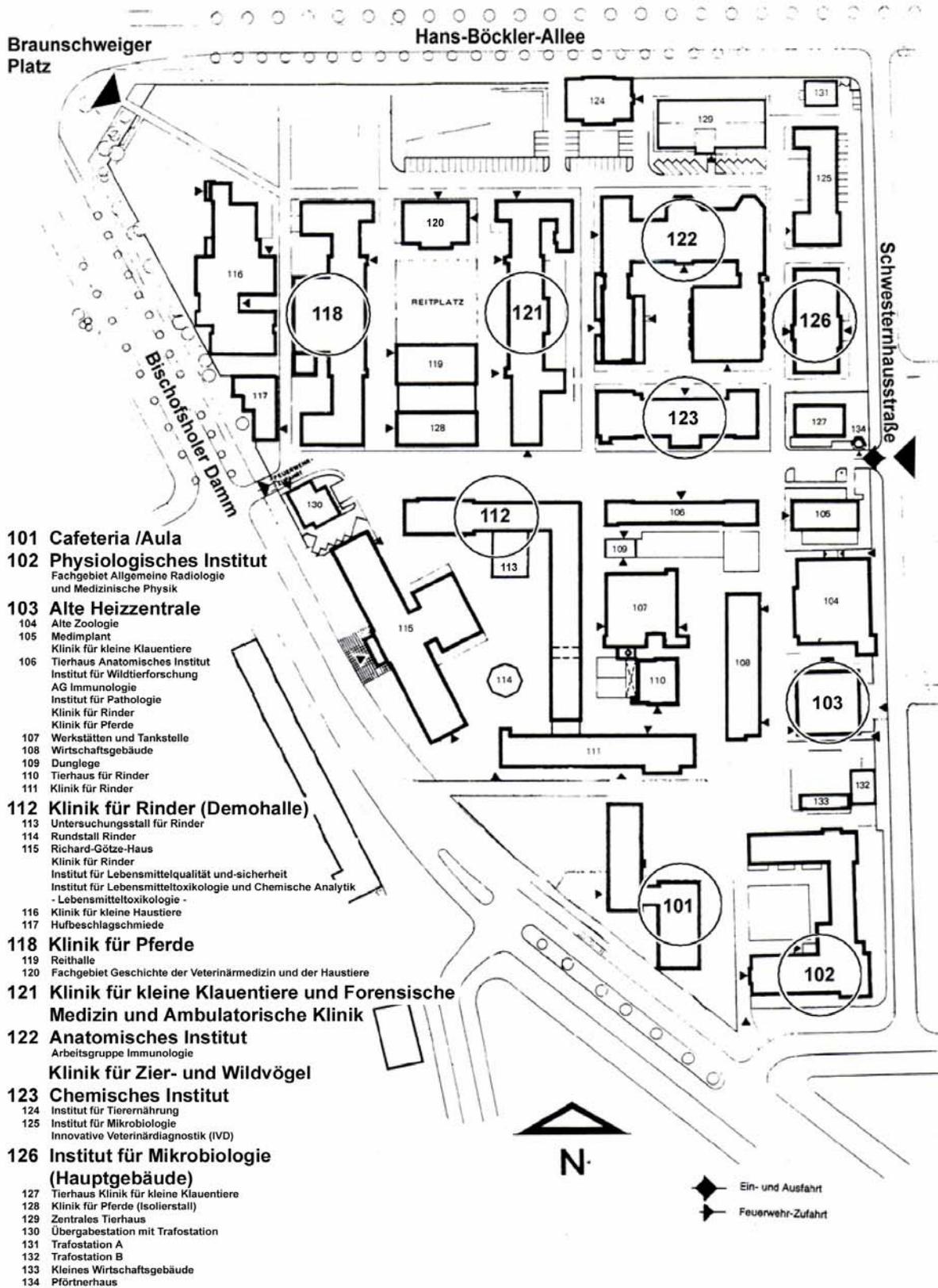
Detailed information on the structure and staffing situation, teaching responsibilities, and other teaching-associated activities of the individual units is given in Annex 3.

Bischofsholer Damm Campus:

Clinics	Buildings: numbers ¹⁾
Clinic for Cattle	106, 108, 110, 111, 112, 113, 114, 115
Clinic for Horses	117, 118 , 119, 128
Clinic for Poultry, facilities Bischofsholer Damm Dept. Feral Birds	122
Clinic for Swine, Small Ruminants and Forensic Medicine (includes the Mobile Clinic [Ambulatory Service])	121 , 127
Small Animal Clinic	116 , 120
Departments and Institutes	
Institute for Anatomy	122
Institute for Food Toxicology and Analytical Chemistry Dept. Analytical Chemistry and Endocrinology	123
Institute for Food Toxicology and Analytical Chemistry, Dept. Food Toxicology	115 , 123
Institute for Food Quality and Food Safety–	115
Institute for Microbiology	125, 126
Institute for Physiology	102
Institute for Animal Nutrition	124 , 129
Institute for Immunology	122
Institute for General Radiology and Medical Physics	102
Institute for the History of Veterinary Medicine and Domestic Animals	120
Associated Establishments	
Institute for Wildlife Biology	106
Lounges and rooms for independent study	
Student Computer Room	111
Anatomical Museum	122
Cafeteria	101

¹⁾ **Bold:** main location

TIERÄRZTLICHE HOCHSCHULE HANNOVER
Gelände Bischofsholer Damm 15



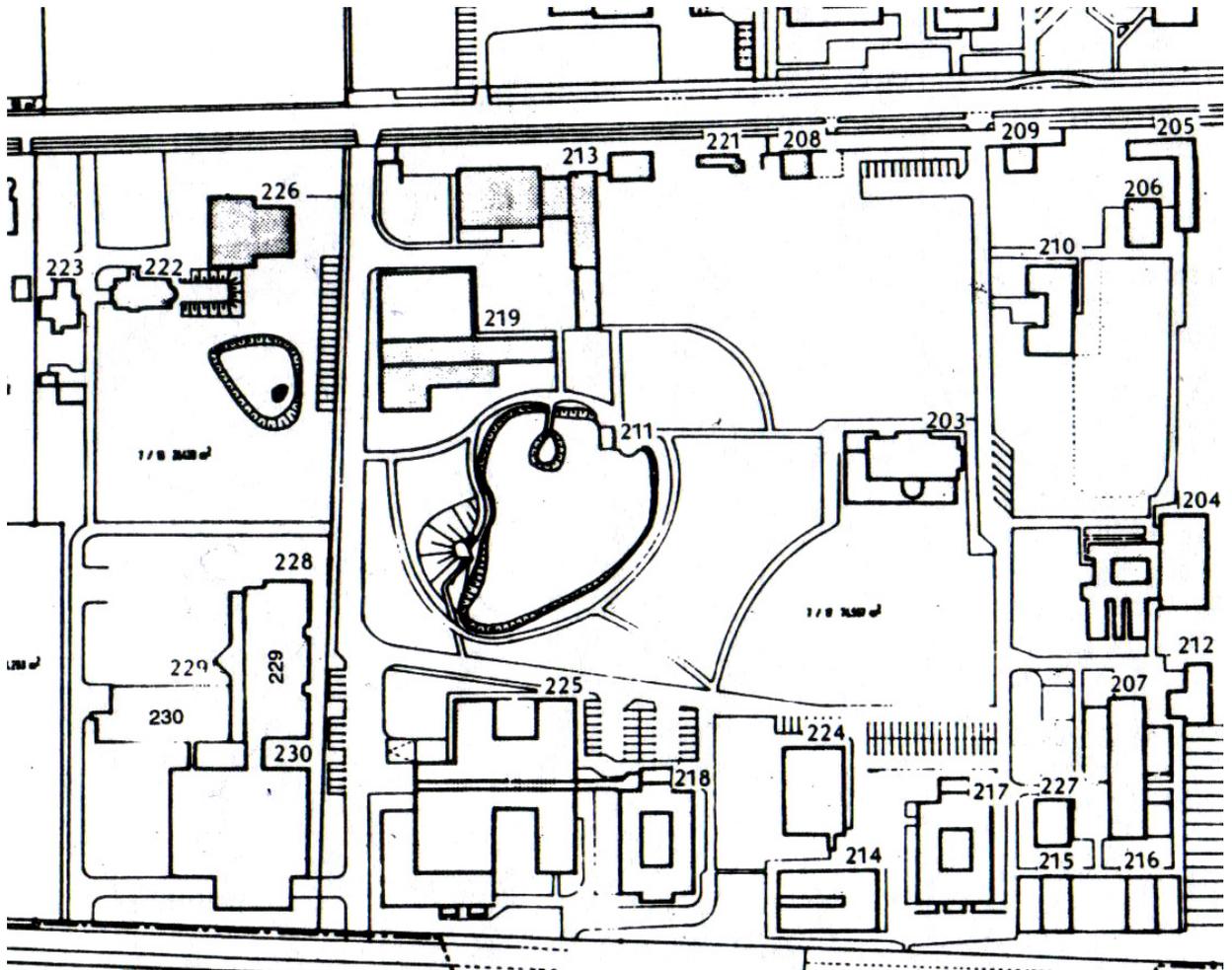
- 101 Cafeteria /Aula**
- 102 Physiologisches Institut**
Fachgebiet Allgemeine Radiologie
und Medizinische Physik
- 103 Alte Heizzentrale**
- 104 Alte Zoologie
- 105 Medimplant
- 106 Tierhaus Anatomisches Institut
Institut für Wildtierforschung
AG Immunologie
Institut für Pathologie
Klinik für Rinder
Klinik für Pferde
- 107 Werkstätten und Tankstelle
- 108 Wirtschaftsgebäude
- 109 Dunglege
- 110 Tierhaus für Rinder
- 111 Klinik für Rinder
- 112 Klinik für Rinder (Demohalle)**
- 113 Untersuchungsstall für Rinder
- 114 Rundstall Rinder
- 115 Richard-Götze-Haus
Klinik für Rinder
Institut für Lebensmittelqualität und-sicherheit
Institut für Lebensmitteltoxikologie und Chemische Analytik
- Lebensmitteltoxikologie -
- 116 Klinik für kleine Haustiere
- 117 Hufbeschlagschmiede
- 118 Klinik für Pferde**
- 119 Reithalle
- 120 Fachgebiet Geschichte der Veterinärmedizin und der Haustiere
- 121 Klinik für kleine Klauentiere und Forensische
Medizin und Ambulatorische Klinik**
- 122 Anatomisches Institut**
Arbeitsgruppe Immunologie
Klinik für Zier- und Wildvögel
- 123 Chemisches Institut**
- 124 Institut für Tierernährung
- 125 Institut für Mikrobiologie
Innovative Veterinärdiagnostik (IVD)
- 126 Institut für Mikrobiologie
(Hauptgebäude)**
- 127 Tierhaus Klinik für kleine Klauentiere
- 128 Klinik für Pferde (Isolierstall)
- 129 Zentrales Tierhaus
- 130 Übergabestation mit Trafostation
- 131 Trafostation A
- 132 Trafostation B
- 133 Kleines Wirtschaftsgebäude
- 134 Pfortnerhaus

Facilities and Equipment

Bünteweg Campus:

Clinics	Buildings: numbers ¹⁾
Clinic for Poultry	217, 214
Departments, Institutes and Units	
Institute for Biometry, Epidemiology and Information Processing	260
Institute for Virology	217, 224
Institute for Parasitology	217, 207, 215, 216
Institute for Pharmacology	218
Institute for Zoology	218
Institute for Animal Breeding and Genetics	201, 202
Institute for Animal Ecology	203, 204
Institute for Animal Hygiene, Animal Welfare and Behaviour of Farm Animals	201, 202
Institute for Animal Welfare and Behaviour (Pet and Laboratory Animals and Horses)	260
Institute for Pathology	229, 230
Institute for Physiological Chemistry	218
Unit for Reproductive Medicine of Clinics	241
Field of Fish Pathology and Fish Farming (belonging to Institute of Parasitology)	217, 227, 207
Institute for Reproductive Biology	261
Library and computer facilities	
Library	262
Student Computer Room	260
General Administration	260

¹⁾ **Bold:** main location



6.1.2 PREMISES USED FOR CLINICS AND HOSPITALISATION

All premises used for clinics and hospitalisation are located on the Bischofsholer Damm site. Since the TiHo is structured according to a species model, the premises for hospitalisation are located in the respective clinics.

Table 6.1: Places available for hospitalisation and animals to be accommodated

	Species	No. places
regular hospitalisation	Cattle	126 (95 cows, 31 calves)
	Horses	64 boxes
	Small ruminants	34 boxes ¹⁾
	Pigs	41 boxes ¹⁾
	Dogs	80 boxes
	Cats	58 boxes
	Fish ²⁾	10 tanks
	Other ³⁾	66
isolation facilities	Horses	8 boxes
	Farm animals	7 boxes (pigs and small ruminants) ¹⁾
	Small animals	26 boxes
	Fish	3 tanks
	Other	28 poultry, 16 petbirds

¹⁾ number of animals that can be accommodated in one box depends on body weight/size (1-10)

²⁾ Ornamental fish, mainly Koi (10 individuals/tank),

³⁾ Rabbits, hamsters, guinea pigs, reptiles, pet-, feral- and zoo birds

6.1.3 PREMISES FOR ANIMALS

Farm animals for teaching purposes are kept mainly at the Farm for Education and Research in Ruthe. The Farm has a total of 236 ha including 41 ha of pasture. It maintains 85 dairy cows in a herd of 200 cattle, 90 breeding sows (the farrows are sold to fattening farms), 30 Mini-Pigs, 5,500 laying hens, 18,500 broilers, 3,000 turkeys, 6,000 ducks and a small group of warm-blooded horses.

Further animals for teaching purposes:

16 beagles (Small Animal Clinic), 60 cows and 6 bulls (Clinic for Cattle), 8 horses (Clinic for Horses), 25 chickens or ducks (Clinic for Poultry), 2 boars, 3 sows, 20 dogs, 9 horses, 1 stallion (Reproductive Medical Unit of the Clinics), 15 cattle, 10 pigs, 15 sheep, 15 goats (Institute for Animal Breeding), 2 cattle, 5 dogs, 6 cats, 2 horses, pigeons and chickens (Institute for Parasitology), 5 rabbits, 10 guinea pigs, 20 pet birds (Institute for Animal Nutrition), 800 mice (Institute for Pharmacology, Toxicology and Pharmacy), 70 *Xenopus Laevis*, 10 rabbits, 3 cattle, 5 sheep, 1 pig, 1 chicken, 10 rats (Institute for Physiology), 33 sheep or goats (Institute for Reproductive Biology), 60 carp or rainbow trout and 120 ornamental fish (Fish

Facilities and Equipment

Pathology and Fish Farming (belonging to Institute of Parasitology)) and 100 rats and 200 mice (Institute for Animal Welfare and Behaviour).

6.1.4 PREMISES USED FOR THEORETICAL, PRACTICAL AND SUPERVISED TEACHING

6.1.4.1 Premises for clinical work and student training

Table 6.2: Premises for clinical work and student training

Small animals	consulting rooms	10
	surgical suites	5
Equine	examination areas	11
	surgical suites	2
Cattle	examination areas	8
	surgical suites	3
Small ruminants	examination areas	1
	surgical suites	1
Pigs	examination areas	13
	surgical suites	3
Bakum	examination areas	1
	surgical suites	-
Ruthe	examination areas	various
	surgical suites	-
Other	examination areas	3 for poultry; 2 for petbirds
	surgical suites	2 for petbirds

6.1.4.2 Premises for lecturing

Number of lecture halls: 23 (19 on the Bischofsholer Damm Campus and 4 on the Bünteweg Campus)

Premises for lecturing on the Bischofsholer Damm Campus		
Identification no. of Building	Name of Building	Places
101	Auditorium (Aula)	427
101	Hupka Room	30
102	Institute for Physiology, lecture hall	270
103	„Alte Heizzentrale“	167
111	Gynaecology, demonstration room	57
112	Clinic for Cattle, demonstration room	43
115	Richard-Götze-Haus, Bayer lecture hall	189
115	Richard-Götze-Haus, demonstration room	128
116	Small Animal Clinic, demonstration room	126
118	Clinic for Horses, demonstration room	72
120	Museum, lecture hall	126
121	Clinic for Swine, Small Ruminants and Forensic Medicine, demonstration room	83
122	Institute for Anatomy, lecture hall	114
122	Institute for Immunology, lecture hall	90
122	Clinic for Poultry, facilities Bischofsholer Damm, lecture hall	108
123	Chemistry, lecture hall	144
123	Chemistry, small lecture hall, 1st floor	38
126	Institute for Microbiology, lecture hall	109
126	Institute for Microbiology, demonstration room	46

Premises for lecturing on the Bünteweg Campus		
Identification no. of Building	Name of Building	Places
201	Institute for Animal Breeding and Genetics, lecture hall	120
228	Institute for Pathology, large lecture hall (central teaching building III) fehlt da nicht noch der Histo-Saal	284
228	Institute for Pathology, small lecture hall	32
241	Unit for Reproductive Medicine, demonstration room	92

Total number of places in lecture halls: 2,895 (2,367 on the Bischofsholer Damm Campus and 528 on the Bünteweg Campus)

6.1.4.3 Premises for group work

Number of premises that can be used for group work (supervised work): 55 (30 on the Bischofsholer Damm Campus and 25 on the Bünteweg Campus.)

Premises for group work on the Bischofsholer Damm Campus			
	Building no.	No. of rooms	No. of places
Clinics			
Clinic for Cattle	111, 115	7	85 (15, 14, 10, 10, 12, 14, 10)
Clinic for Horses	118	2	38 (30, 8)
Clinic for Poultry, facilities Bischofsholer Damm	122	1	10
Clinic for Swine, Small Ruminants and Forensic Medicine	121	3	36 (8, 8, 20)
Small Animal Clinic	116a	1	20
Departments and Institutes			
Institute for Anatomy	122	1	49
Institute for Food Quality and Food Safety	115	1	20
Institute for Food Toxicology and Analytical Chemistry	123	3	63 (25, 23, 15)
Institute for Microbiology	126	2	24 (10,14)
Institute for Physiology	102	6	80 (2 x 20, 4 x 10)
Institute for Animal Nutrition	124	1	8
Institute for Immunology	122	1	20
Institute for the History of Veterinary Medicine and Domestic Animals	120	1	20

Premises for group work on the Bünteweg Campus			
	Building no.	No. of rooms	No. of places
Clinics			
Clinic for Poultry, facilities Bünteweg	217	1	15
Departments, Institutes, and Units			
Institute for Biometry, Epidemiology and Information Processing	260	1	20
Institute for Virology	217	1	10
Institute for Parasitology	217	1	25
Institute for Pharmacology	218	1	25
Institute for Zoology	218	2	50 (40, 10)
Institute for Animal Breeding and Genetics	201	2	45 (40, 5)
Institute for Animal Ecology	203	1	10
Institute for Animal Hygiene, Animal Welfare and Behaviour of Farm Animals	202	1	30
Institute for Animal Welfare and Behaviour (Pet and Laboratory Animals and Horses)	260	2	32 (16, 16)
Institute for Pathology	229	1	36 (16, 20)
Institute for Physiological Chemistry	218	1	10
Institute for Reproductive Biology	261	1	20
Fish Pathology and Fish Farming (integrated into Institute of Parasitology)	227, 207	1	10
Central teaching facilities			
TiHo Tower	260	5	160 (60, 40, 3 x 20)
Central Teaching Building I	219	2	87 (45, 42)

Total number of places in rooms for group work (supervised work): 1,034 (439 on the Bischofsholer Damm Campus and 585 on the Bünteweg Campus).

6.1.4.4 Premises for practical work

Number of laboratories for practical work by students: 38 (16 on the Bischofsholer Damm Campus and 23 on the Bünteweg Campus)

Facilities and Equipment

Premises for practical work on the Bischofsholer Damm Campus		
Identification no. of building	Name of building	Places
102	Institute for Physiology, course room 1	40
102	Institute for General Radiology and Medical Physics, laboratories	20 (4 x 5)
102	Institute for Physiology, course room 2	35
116	Small Animal Clinic	30 (3 x 10)
118	Clinic for Horses, course room	44
121	Clinic for Swine, Small Ruminants and Forensic Medicine, demonstration room	48
122	Institute for Anatomy, dissection course room "east"	120
122	Institute for Anatomy, dissection course room "west"	120
123	Chemistry, course laboratory, 1st floor	92
123	Chemistry, course laboratory, 2nd floor	48
124	Institute for Animal Nutrition, course room	54
126	Institute for Microbiology, course room and student laboratory	94 (90, 4)

Premises for practical work on the Bünteweg campus		
202	Institute for Animal Breeding and Genetics, course room	45 (35, 5, 5)
207	Fish Pathology and Fish Farming (integrated into Institute of Parasitology)	15
217	Clinic for Poultry, sectioning room and laboratories	33 (15, 3 x 6)
217	Institute for Virology, laboratory	4
217	Institute for Parasitology	25
218	Institute for Pharmacology	76
228	Institute for Pathology, large course room (Central Teaching Building III)	142
228	Institute for Pathology, small course rooms	76 (36, 20, 10, 10)
230	Institute for Pathology, necropsy room	60
261	Institute for Reproductive Biology,	35
260	Institute for Biometry, Epidemiology and Information Processing, central computer lecture room	50
Central teaching facilities		
219	Central Teaching Building I,	90 (20, 35, 35)
226	Central Teaching Building II	80

Total number of places in laboratories: 1,476 (745 on the Bischofsholer Damm Campus and 731 on the Bünteweg Campus)

Health and safety measures: General health and safety measures include provision of a locker for every two students for protective clothing on the Bischofsholer Damm Campus; here, students can store a coat and boots for their clinical classes. As the highest risk is assumed to originate from material in pathology, students there have to wear protective clothing of distinctive colours (including aprons, rubber boots, gloves and if necessary safety goggles) at all times, and individual lockers are provided for each student to keep their gear in. For clinical work students receive TiHo clothing in different colours with special name tags for identification.

All laboratories where students come into contact with potentially hazardous material (anatomy, microbiology and pathology) have forced ventilation, and no formaldehyde-fixed materials are used in anatomy courses.

All students are informed in small groups about the risks of transmitting highly contagious animal diseases (primarily FMD) in their second year during their practical period on the Farm for Education and Research in Ruthe.

All clinics routinely provide facilities for students to clean and disinfect their aprons and rubber boots. In case of outbreaks of disease (CSF, FMD), disposable protective clothing is also available to students. In addition, all clinics and departments are equipped with telephones, first aid kits, and fire extinguishers.

Prior to each laboratory course students are informed by the lecturer about the specific measures to adhere to during the course. Female students have to sign a form in which they are informed about regulations related to pregnancy.

6.1.5 DIAGNOSTIC LABORATORIES AND CLINICAL SUPPORT SERVICES

6.1.5.1 Diagnostic laboratories

Routine clinical laboratory diagnostics are performed in each clinic specialising in the respective animal species. In all diagnostic laboratories of the Clinics and Institutes relevant teaching is held; students are taught the techniques and spectrum of methods of analysis in small groups.

Facilities are designed to host small students groups for teaching purposes.

With the exception of poultry and fish, diagnostic pathology is performed for all clinics in the diagnostic unit of the Institute for Pathology (including a necropsy room of 1,200 m²). The diagnostic unit provides a 5-day per week service performing approximately 2,500 necropsies and analysing 7,500 surgical biopsy samples per year from within and outside the TiHo.

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Specialised diagnostic services are provided by the responsible TiHo laboratories (animal nutrition, immunology, endocrinology, microbiology, parasitology, pharmacology, toxicology, virology, etc.).

The Field Station for Epidemiology in Bakum is equipped with a necropsy room and a well-equipped diagnostic laboratory.

6.1.5.2 Central clinical support services

The TiHo has a part-time contract with a specialised ophthalmologist who teaches ophthalmology in all species and acts as a consultant for all Clinics. The Institute for General Radiology and Medical Physics cooperates closely with all Clinics in order to further improve diagnostic imaging procedures effectively in respect to quality and safety management. In accordance with the species-specific structure, each Clinic runs its own routine diagnostic imaging and anaesthesia service. With the new building of the Clinic Complex at Bünteweg diagnostic imaging systems will be pooled for the three Clinics located there. A professorship for imaging systems will be set up which will work across the Clinics. Likewise, the Professorship for Anaesthesia and Intensive Medicine will work across the Clinics.

6.1.6 SLAUGHTERHOUSE FACILITIES

An in-house facility for the training of students is available in the Institute for Food Quality and Food Safety (cf. 4.8 above). In order to obtain suitable material, the TiHo has access to a large number of slaughterhouses in Lower Saxony, from which carcasses can be collected for student teaching in the in-house facilities. The contacts aid in training students in their practical period, for training graduate students and for research projects.

6.1.7 FOODSTUFF PROCESSING UNIT

The TiHo has a small in-house foodstuff processing unit which provides appropriate access for undergraduate students. A butcher is employed in the Institute for Food Quality and Food Safety to provide professional instruction in the practical aspect of meat processing and sausage production. To obtain additional material for teaching, the Institute maintains close contacts to several food processing companies which regularly provide samples and permit visits by groups of undergraduate students.

6.1.8 WASTE MANAGEMENT

The removal and disposal of waste at the TiHo is organised according to the different types of materials involved as shown in the diagram below.

Disposal of **hazardous waste** (such as used solvents, laboratory reagents, acids, bases and photographic chemicals) is organised centrally. These materials are collected separately in 5-10 litre containers in the laboratories and are delivered to the Section for Waste Disposal and Environmental Protection of the central administration and then stored until they can be disposed of according to national environmental regulations. The transport of hazardous waste is subject to the Federal Regulation on Transporting Hazardous Substances (GGVS/ADR) and must be undertaken with a vehicle especially equipped and under the supervision of two trained workers from the Section for Waste Disposal and Environmental Protection. The collected waste is stored in a separate area equipped with special safety features such as explosion-protected construction, CO₂ fire extinguisher system, in storage areas for flammable solvent waste and flooring impermeable to solvents.

Household waste is classified either as **recyclable** (packaging such as paper, cardboard and all material marked with the commercial “Green Dot” recycling symbol) or as **disposable**. These materials are collected in separate containers and are removed either by the municipal waste management authority of the City of Hannover or by TiHo employees.

Disposable household waste also contains **non-infectious waste** from the various Institutes/Clinics (e.g., autoclaved bacteriological material). In order to prevent injury or harm to cleaning personnel, waste containing injection needles or scalpel blades is not thrown directly into waste containers. These items are first collected in separate closed and labelled containers, which are then put into the household waste for disposal.

Infectious material is autoclaved before being disposed of with the household waste.

Non-infectious animal excretions such as urine and faeces are first collected with the straw bedding and placed in a container or on a muckheap. This manure is then either delivered to farmers in the surrounding area to be spread on their farmland or taken to the municipal dump. Milk from hospitalised cows is delivered as raw material to a bio-gas production facility.

Carcasses, organs and tissue samples of necropsied animals are stored separately in walk-in refrigerators until removed by the local rendering plant. The material is separated into one of four different hazard and price categories and disposed of appropriately:

- a) Necropsied and intact carcasses of large animals including horses, cattle, large zoo and wild animals are collected twice a week with individual registration of the species.
- b) Carcasses and internal organs of calves and small domestic ruminants and internal organs of necropsied large ruminants are removed once a week.

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- c) Carcasses and organs of pigs, poultry, ponies, donkeys and foals are collected once a week.
- d) Carcasses of dogs, cats, small laboratory animals and small zoo and wild animals are collected once a week.

The **cleaning water** used for cleaning the necropsy hall is collected in several tanks for possible subsequent thermal disinfection. The disinfection procedure is recorded automatically and monitored by specialised personnel of the technical staff of the University of Veterinary Medicine.

Discarded **formalin** in the Institute for Pathology is collected separately in a 3,000-litre underground tank which is cleared approximately once a year for final disposal by a specialised company.

Radioactive Waste with half-life under 100 days is disposed of on every property centrally in decaying storage facilities. There it is stored until the specific activity has gone below the critical value for every isotope. After the decaying time the residual materials are disposed of in the conventional manner (incinerated).

6.1.9 FUTURE CHANGES

The Small Animal Clinic and the Clinic for Horses will move to Bünteweg. In this new Clinic Complex („*Klinikum am Bünteweg*“) the Clinic for Pets, Reptiles and Pet and Feral Birds will likewise be incorporated. It has already been officially founded for organisational legal reasons and will be perceived by the public as an entirely independent clinic with its move to the Clinic Complex. The Clinic Complex will provide these clinics with optimal facilities and equipment for teaching, research and services. As previously mentioned under 6.1.5 2 new professorships will be appointed with regard to the partly new tasks and possibilities in research and service.

For communication among the Clinics and the Diagnostic Laboratories the "Integrated Veterinary Information System (IVIS)" has been implemented in nearly all Clinics and Institutes with diagnostic service. It combines the 2 subprogrammes "Vetware" (patient documentation) and "Labcontrol" (laboratory data incl. invoicing).

For research in infectious diseases a new high safety facility (L4vet/S3) including animal housing is to be built.

6.2 COMMENTS

The TiHo has a sufficient number of lecture halls and a large number of rooms in which group work can be held. Likewise, a lot of rooms are available for practical work. These rooms are equipped with modern technical equipment.

The facilities are despite their age generally in a good condition. The new clinics at Bünteweg Campus will significantly improve facilities for patients, employees and students.

Also a large lecture hall will be built in the new clinic complex to accommodate the increased student numbers so that a total of 4 large lecture halls at the TiHo, each seating more than 250, will be available.

Students have access to computer rooms at both campuses. The computers are of standard so that sophisticated applications and e-learning programs can be handled without any problems.

6.3 SUGGESTIONS

- W-LAN Network for an e-campus at Bünteweg
- Mensa extension, cafeteria and self study space at Bünteweg Campus

7 ANIMALS AND TEACHING MATERIAL OF ANIMAL ORIGIN

7.1 FACTUAL INFORMATION

7.1.1 ANATOMY

Table 7.1: Material used in practical anatomical training

	Dog		Goat		Equine		Other	
	Year 2006	Year 2005	Year 2006	Year 2005	Year 2006	Year 2005	Year 2006	Year 2005
Live animals	none	none						
Cadavers	15	15	50	50	14	14	Pig 50 Cat 74 Chicken 120 Guinea pigs 30# Rabbit 30# Snakes 16# Turtles 14# Other reptiles 15#	50 74 120
Specimen								
Heads					10	10		
Feet					46	46		
Eyes							50 (pig, cow)	
Other								
computer assisted learning (casus)					x		x (bovine)	

Animals used for electives only

All cadavers dissected by students were either fresh (shortly after euthanasia), or cooled, or frozen and thawed, or stored in a saline solution; no formalin-fixed cadavers were used in the dissection courses

7.1.2 PATHOLOGY

Table 7.2: Number of necropsies over the past 3 years

	Species	Number of necropsies			Annual Average	Total
		2006	2005	2004		
Food-producing animals;	Cattle	300	216	357	291	3,600
	Small ruminants	180	187	222	196	
	Pigs	594	992	1,269	952	
	Pigs ¹	2,071	1,779	2,211	2,020	
	Fish ²	230	95	97	141	
Equine	Equines	162	141	195	166	166
Poultry		3,155	2,823	2,854	2,944	3,009
Rabbits		82	49	63	65	
Companion animals/exotic	Dogs	234	188	311	244	1,268
	Cats	121	142	198	154	
	Pet-, feral-, and zoobirds	56	73	162	97	
	Fish ³	530	250	260	347	
	Other ⁴	363	589	326	426	

¹ Necropsies in the Field Station Bakum

² Common carp and rainbow trout

³ Goldfish, Koi Carp, various warm water ornamental fish

⁴ Guinea pigs, hamsters, zoo- and wildlife species, including snakes, turtles etc.

Additional sources of material for the teaching of necropsies and pathological anatomy, including slaughterhouse material (approx. numbers per year):

Small Animal Clinic: euthanised patients

Clinic for Small Ruminants: organs from slaughtered animals (genitals, lungs and extremities)

Clinic for Cattle: 125 distal phalanxes, 125 udders, 125 tails, 125 uteri, 125 heads, 125 intestines, 125 pieces of skin, 125 pieces of ruminal walls, 125 pieces of abomasal walls, 125 testicles with scrotum, 20 complete abomasi, 40 vaginae, 30 frozen calves, 20 animals for ruminotomy, 20 pregnant animals for sectio caesura

Clinic for Horses: 20 horses heads and 40 limbs

Clinic for Poultry: 20-40 organ, blood and faecal samples from poultry, pet and feral birds

Institute for Parasitology: fresh bovine liver

Institute for Food Toxicology and Chemical Analysis: udders, skin biopsies

Institute for Animal Breeding: 5 cattle, 5 pigs

7.1.3 ANIMAL PRODUCTION

Students have access to healthy farm animals at the Farm for Education and Research in Ruthe, the Institute for Animal Breeding and Genetics, the Institute for Reproductive Biology and Institute for Physiology. Also healthy male specimens (cattle, pigs, sheep, goats) are kept at the Institute for Reproductive Medicine (cf. 6.1.3). Additionally, students have access to healthy farm animals within the scope of herd health management visits to farms (see below and Table 7.5).

7.1.4 FOOD HYGIENE/PUBLIC HEALTH

The Institute of Food Quality and Food Safety receives muscle samples of infected mice from the Institute for Parasitology in order to demonstrate *Trichinella spiralis* in meat inspection. Carcasses and by-products are obtained from slaughterhouses.

Table 7.3: Number of carcasses obtained for teaching purposes each year

Species	Number of carcasses and by-products
Pig	100
Cattle	15 - 20
Sheep	10
Poultry	120
Game	5 - 15
Horse	1 - 2

For teaching food hygiene animal products - conserves and other processed foodstuffs - are bought from or donated by the respective manufacturers. For practical courses the following materials (with and without alterations/defects) are provided to each student:

- Fresh meat from pig, calf, cattle, sheep, horse, game
- Four different kinds of minced meat and two minced meat products
- Fat tissue from pig and cattle and products thereof
- Three different sorts of sausage
- Meat conserves and packaged meat products
- Five eggs with different defects
- Fresh and frozen poultry
- Fresh fish
- Four different kinds of fish products

7.1.5 CONSULTATIONS AND PATIENT FLOW SERVICES

7.1.5.1 Consultation

The clinics are open 52 weeks a year, with five consultation days each week. Regular opening hours are Mon to Fri 8. a.m – 5 p.m. Additional emergency service is provided from 5 p.m. to 8 a.m. and 24 h at weekends.

7.1.5.2 Patient flow

Table 7.3: Number of cases: a) received for consultation, and b) hospitalised in the TiHo Clinics in the past three years.

Species		Number of cases						Average	total
		2006		2005		2004			
		a	b	a	b	a	b	a / b	
Food producing	Bovine		1,600		1,500		1,550	0 / 1,550	2,617
	Porcine	32	347	18	523	11	411	20 / 427	
	Small ruminants	103	556	75	579	74	564	84 / 566	
	Other farm animals*		30		18		11	20	
Poultry			3,122		2,820		2,846	0 / 2,929	2,929 ¹⁾
Rabbits									
Equine	Equines	1,903	690	1,413	577	1,436	576	1584 / 614	2,198
Companion Animals /Exotics	Canine	12,403	2,219	11,556	2,491	13,120	2,693	12,360 / 2,468	26,403
	Feline	3,388	629	3,241	722	3,052	650	3,227 / 667	
	Pet-, wild- and zoobirds	3,567	713	3,738	681	4,241	1013	3,849 / 802	
	Other pets**	2,708	505	2,340	523	2,484	529	2,511 / 519	

* alpaca, guanaco, deer, fallow deer, reindeer ¹⁾ These patients do not leave the Clinic, but correspond to the number of necropsies, **pets (rabbits, hamsters, guinea pigs, reptiles)

7.1.6 VEHICLES FOR ANIMAL TRANSPORT

The Clinic for Cattle has three trucks at its disposal with a transport capacity for two or three adult cattle. One of these trucks is equipped with a hydraulic platform for lifting recumbent animals. Two special trailers are shared with other Clinics for transporting euthanized animals to the Department of Pathology.

Animals and Teaching Material of Animal Origin

The Clinic for Horses owns one truck for transporting horses, the Clinic for Small Ruminants and Pigs a car with trailer.

Additionally, most of the Clinics and Institutes have a car or bus for transporting students to practical courses on farms etc..

7.1.7 ON-CALL EMERGENCY SERVICE

All clinics with the exception of the facility for pet and feral birds in the Clinic for Poultry (facility Bischofsholer Damm) and the Fish Pathology and Fish Farming provide an emergency service from 5 p.m. to 8.a.m. and 24 h at weekends.

7.1.8 ON FARM TEACHING AND OUTSIDE PATIENT CARE

7.1.8.1 Ambulatory (Mobile) Clinic

The Mobile Clinic operates 52 weeks per year with five consultation days each week and additional stand-by service at night and at weekends. Consultation hours are from 8 a.m. to 5 p.m. During stand-by service one of the veterinary surgeons receives incoming phone calls at home and, in emergencies, carries out visits to patients. Animals treated by the veterinary surgeons of the Mobile Clinic are mainly cattle, but also include horses, small ruminants and pigs.

In addition to the Mobile Clinic, the Clinic for Poultry, the Clinic for Cattle and the Field Station in Bakum each runs a herd health service for the respective species. The services are offered upon prior consultation on working days. All ambulatory and herd health service visits are performed with students on a scheduled basis.

In total the Clinics and the Field Station in Bakum run four VW buses with seats for four to six students each, and four VW cars with room for three to four students each.

Table 7.4: Number of cases seen by the Ambulatory (Mobile Clinics) in the past three years.

	Species	Number of patients			Ave- rage	Total
		2006	2005	2004		
Food-producing animals	Cattle	5,930	5,494	6,056	5,827	8,762
	Small	384	338	271	331	
	Pigs	2,979	1,797	2,872	2,549	
	Fish ¹⁾	62	56	47	55	
	Other farm					
Poultry (no. of flocks) ²⁾		276	322	363	320	320
Rabbits (no. production units)						
Equine		257	262	246	255	255
Fish ³⁾		2,300	1,270	1,050	1,540	1,568
Other ⁴⁾		40	27	17	28	

¹⁾ Common carp, rainbow trout, turbot

²⁾ Including pigeons

³⁾ Ornamental fish: goldfish, koi and various warm water ornamentals

⁴⁾ Dogs, geese, zoo-, circus animals

Average number of visits in a year to farms and studs by the Mobile Clinic:

Mobile Clinic of the Ambulatory Clinic for Swine, small ruminants and forensic medicine):

Visits 2004: 3,860

Visits 2005: 3,676

Visits 2006: 3,452

Herd health service:

Cattle ca. 352/year

Swine ca. 155/year

Small ruminants ca. 220/year

Poultry ca. 320/year

Fish ca. 55/year

Total: 1,102 visits herd health service/year

7.1.8.2 Other on farm services and outside teaching

Table 7.5: Number of herds or farms/plants which are contractually visited on a regular basis by facilities of the TiHo.

	Species	Number of herds			Average	Total
		2006	2005	2004		
Food-producing animals	Cattle ¹⁾	104	99	95	99	275
	Small ruminants	148	141	136	142	
	Pigs	24	27	30	27	
	Fish ²⁾	10	5	5	7	
	Poultry (no. of flocks)	23	24	24	24	24
	Rabbits (no. production units)					
	Equine	75	80	76	77	77
	Fish ³⁾	5	2	2	3	3

¹⁾ Cattle herds: 40 to 200 individuals

²⁾ Rainbow trout, common carp, turbot, sea bream

³⁾ Ornamental carp (koi) and goldfish (Herd size: Aquaculture farms produce between 2 and 10 tonnes of fish per annum. The number of animals is difficult to estimate. Ponds contain between 5,000 and 100,000 individuals. Farm sizes range between 10 and 30 ponds/ tanks. Thus, herd sizes range between 50,000 and 3,000,000 individuals. Herd size in ornamental fish farms ranges between 5,000 and 20,000 individuals.

7.1.9 OTHER INFORMATION

For clinical training purposes 12 cows are purchased by the Clinic for Cattle each year for rectal palpation exercises, as are 40 cows in late pregnancy for caesarean sections by students.

The level of clinical service offered is better than in outside practices. Facilities, equipment and expertise are better than average outside services and the responsiveness is adequate.

Overall, the majority of cases treated in the Clinics (between 70% and more than 90%, depending on the Clinic) are referrals. Exceptions are the Facility for Pet and Feral Birds of the Clinic for Poultry and the Fish Pathology and Fish Farming (belonging to Institute of Parasitology), where approximately 50% are first-opinion cases.

The Small Animal Clinic covers special education in internal medicine and clinical pathology, surgery, neurology, oncology, anaesthesia, imaging-techniques and ophthalmology.

The Clinic for Cattle covers special education in energy metabolism and liver health, rumen metabolism, trace elements and vitamin deficiencies, reproductive medicine,

udder diseases, diseases of the newborn, foot health, herd health management and production medicine.

The Clinic for Swine, Small Ruminants and Forensic Medicine is specialised in internal medicine and laboratory investigations, surgery, gnotobiotechnique, anaesthesia, x-ray and ultrasound imaging, reproductive medicine, herd health management and diseases of small ruminants.

The Clinic for Horses covers special education in internal medicine and laboratory investigations, surgery including minimally invasive techniques, imaging-techniques, reproductive medicine and obstetrics.

The Facility for Pet and Feral Birds of the Clinic for Poultry is particularly specialised in surgery, while the main Clinic for Poultry is specialised in infectious diseases (particularly viral diseases) and vaccine development, herd health management.

The Fish Pathology and Fish Farming (integrated into Institute of Parasitology) is specialised in infectious diseases (particularly viral diseases).

Fees for services are calculated on the basis of the national by-law stating the amounts to be charged for different veterinary services or above. Therefore, fees are generally comparable to those charged by private practitioners, although higher fees are possible due to specialisation of services. Teaching or scientific interest do also justify lower charges.

In general there is intensive cooperation with outside practitioners, as the TiHo Clinics are fully accepted for their referral work and provide diagnostic and advisory services for private practitioners. Practitioners in general do not participate in teaching at the TiHo but do accept students for their mandatory extramural work.

Relationships with other outside organisations (governmental veterinary services, governmental research stations, pharmaceutical industry) are very good.

7.1.10 RATIOS

Table 7.6: Animals available for clinical training (in the Clinics of the Faculty or seen by the Ambulatory Clinic) as ratio to the number of students in last full year of clinical training

R9	$\frac{\text{no. of students graduating annually}}{\text{no. of food-producing animals seen at the Faculty}^{1)}} = \frac{214}{2,617} = \frac{1}{12.2}$
R10	$\frac{\text{no. of students graduating annually}}{\text{no. of individual food-animal consultations outside the Faculty}^{2)3)}} = \frac{214}{8,762} = \frac{1}{40.9}$
R11	$\frac{\text{no. of students graduating annually}}{\text{number of herd health visits}^{3)}} = \frac{214}{1,102} = \frac{1}{5.1}$
R12	$\frac{\text{no. of students graduating annually}}{\text{no. of equine cases}^{1)}} = \frac{214}{2,198} = \frac{1}{10.3}$
R13	$\frac{\text{no. of students graduating annually}}{\text{no. of poultry/rabbit cases}^{1)}} = \frac{214}{2,929} = \frac{1}{13.7}$
R14	$\frac{\text{no. of students graduating annually}}{\text{no. of companion animals}^{1)} \text{ seen at Faculty}} = \frac{214}{26,403} = \frac{1}{123}$
R15	$\frac{\text{no. of students graduating annually}}{\text{Poultry (flocks)/rabbits(prod. units) seen}^{2)3)}} = \frac{214}{320} = \frac{1}{1.5}$

¹⁾Table 7.3, average; ²⁾Table 7.4, average; ³⁾ see 7.1.8.1

Table 7.6: Animals available for necropsy

R16	$\frac{\text{no. of students graduating annually}}{\text{no. necropsies food producing animals + equines}^{1)}} = \frac{214}{3,766} = \frac{1}{17.6}$
R17	$\frac{\text{no. of students graduating annually}}{\text{no. necropsies poultry/rabbits}^{1)}} = \frac{214}{3,009} = \frac{1}{14.1}$
R18	$\frac{\text{no. of students graduating annually}}{\text{necropsies companion animals}^{1)}} = \frac{214}{1,268} = \frac{1}{5.9}$

¹⁾ Table 7.2, average

7.1.11 OTHER SPECIES

The Fish Pathology and Fish Farming treats ornamental fish. Here the patient number is constantly increasing, particularly for koi carp. The Institute possesses tanks with insulation possibilities. In addition, contracts exist between the Institute and fish farms for fish herd health management courses. The pathological examinations are undertaken by the Institute itself. (See tables 7.2, 7.4 and 7.5).

The associated Institute for Wildlife Research looks after various wildlife species in Lower Saxony in its teaching and research.

7.2 COMMENTS

The number of animal material and necropsies which are available to students is remarkably high and ideal for clinical education. Additional purchase of animals occurs for particular practical exercises such as caesarean sections, anatomy and special surgical techniques. All patients are used for undergraduate and graduate student teaching and for research.

Food producing animals are particularly well represented due to the location of the University in Lower Saxony, the most important state for animal production in Germany.

Herd health medicine is of paramount importance in the clinical services for farm animals. Herd health visits cover all food producing animals such as bovine, small ruminants, swine, fish and poultry. Due to the fact that swine and poultry and to an increasing extent cattle are kept in large units with increasing biosecurity measures, the herd health service is of utmost importance for teaching. Students accompany all herd health visits. To meet the increasing need for specialised large animal practitioners the TiHo places emphasis on teaching in food animal herd health medicine.

A significant number of companion animals are treated in the Clinic; most are referral cases. This is especially important in order to cover specialisation aspects in teaching. A major development in clinical services will occur with the move to the new Clinic Complex at Bünteweg, providing extended facilities for specialisation according to the European Board of Veterinary Specialisation.

The number of necropsies of all species is remarkably high. Special emphasis is given to swine necropsies in the context of herd health visits to farms of our Field Station for Epidemiology in Bakum. Farm visits and necropsies are made with students.

7.3 SUGGESTIONS

We are confident that the number of patients and necropsies are in the category 'satisfactory'.

8 LIBRARY AND LEARNING RESOURCES

8.1 FACTUAL INFORMATION

At the TiHo there is a Main Library which is accessible to all students. In addition, most Institutes and Clinics provide a small library open to students and employees.

In addition to the IT workstations in the library the TiHo offers its students IT-facilities in the administration building (30 computer places) and at Bischofsholer Damm (10 terminals).

8.1.1 LIBRARY AND OTHER INFORMATION TECHNOLOGY SERVICES

The Main Library of the TiHo is closely linked with the libraries of other universities in Hannover. All students and faculty members of all establishments of higher education have access to all libraries with a single admission pass. The Main Library of the TiHo is managed by a director. A library committee oversees the services of the library and advises on issues concerning co-operation between the library and institutes and the needs of the users.

The Main Library's budget over the past three years was:

Year	Budget *
2007	€ 263,500 + € 93,500 DFG + €50,000 from student fees
2006	€ 263,500 + € 93,500 DFG
2005	€ 263,500 + € 93,500 DFG

* excluding personnel, building maintenance, centrally paid IT and e-literature etc.

Number of loans to students per academic year: 12,219

Computerised document search system: WinSPIRS, search and retrieval software for Microsoft Windows via ERL (Electronic Reference Library) is installed on a central server, produced by SilverPlatter OVID, with the databases BEASTCD, VETCD and PARASITECD, which are accessible to faculty, staff and students. This service can be used on any computer at the TiHo connected to the intranet or from a private computer accessing WinSPIRS via internet by proxy connection and password.

Since the beginning of 2003 The Web of Science (© ISI), which contains the Science Citation Index (© ISI), has been accessible to any user within the TiHo's IP ranges. A large number of electronic journals has been made available through the Lower

Library and Learning Resources

Saxonian Consortium (packages from American Chemical Society, Annual Reviews, Blackwell STM-Collection, BMJ Publishing Group, Cambridge University Press, DeGruyter, Karger, Oxford University Press, Royal Society of Chemistry, Springer and Wiley) and subscription to the current year plus 4 previous years of Elsevier Life Sciences; there is access to more than 4,100 electronic journals.

Regularly students have the opportunity to receive a basic introduction to the WinSPIRS and the **PUBMED** (© National Library of Medicine) retrievable databases which contain MEDLINE, amongst others. The introduction is provided by a library staff member. Further, five computers in the public access area of the library have internet access to the databases.

There is an **Audio-Visual Service** located in the rooms of the Main Library which is run by the same personnel. In total, students have access to 571 videos and a variety of CD-ROMs for study purposes. The videos are catalogued according to subjects; the catalogue is deposited at the service point of the Main Library. The videos can be checked out and viewed in one of three video rooms in the library building. Apart from the videos there are slide collections on different subjects which are accessible accordingly. Videos and slides are accessible during library opening hours. At present e-learning is replacing these services.

Main library:

- Is this specific to the veterinary training establishment?	Y		
- Is this common to two or more establishments?	N		
- Full time equivalents of part-time employees	0.5		
- Number of full-time employees	13		
- Number of journals received each year as hard copies	1,068		
- Numbers of full access electronic journals	>4,100		
- Availabilities for online literature search	Y		
- Availability of textbooks	Y		
- Number of student reading places	71		
- Library opening hours:	weekday	weekend	
• during term-time	40 h	3 h	
• during vacations	40 h	3 h	
- Indicate how the facilities are used by students	>15,000		
	uses/p.a.		

Subsidiary libraries of the establishment:

All Clinics, Departments and Institutes have small subsidiary libraries. Journals and books present in these libraries are not catalogued in the Main Library. Access is

usually limited to faculty and graduate students. Undergraduates have access upon request and permission of the respective institute during working hours.

8.2 COMMENTS

The library is generously laid out and has sufficient facilities for students and other users. Opening hours have been audited and adjusted to the main needs.

The collections are amongst the largest in Europe. The library hosts the core collection of literature in the fields of veterinary science and general parasitology funded by the German Research Foundation, DFG, with access provided to all of Germany. The recently set up Virtual Library, a website of select internet resources at

<http://elib.tiho-hannover.de/virtlib/index-e.html> (also sponsored by the DFG) for the same subjects is continuously augmented. High-quality electronic documents and internet resources are collected and arranged systematically. Search engines for this site and a general veterinary search engine have been set up.

IT-facilities are offered to a sufficient extent at various locations of the University. The computers in the CIP-pool (administration building) are of the latest technology. The TiHo IT-Service Unit instructs students in the use of the Pegasus e-mail program, internet and applications such as MS-Word, MS-Excel, MS-Powerpoint and the Statistical Analysis System SAS.

The introduction of the Integrated Veterinary Information System (IVIS) in the Clinics will be completed with the move to the new Clinic Complex at Bünteweg. All diagnostic results obtained will be combined in this system and will be principally accessible to staff and students involved.

Multimedia-aided teaching and interactive learning programs are supported to an increasing amount as described in Chapter 5.1.1.

8.3 SUGGESTIONS

Funds are increased at present by making use of student contributions in order to be able to fulfil students' wishes for additional teaching materials.

Further increase in access to electronic journals. Unfortunately costs are unfairly and ever increasing high. The Lower Saxony consortium of all university libraries does provide financial support.

Investment in e-learning programs is of utmost priority.

9 STUDENT ADMISSION AND ENROLMENT

9.1 UNDERGRADUATE COURSES

9.1.1 UNDERGRADUATE STUDENT NUMBERS

Minimum number of years (MNY): 5.5 years

Table 9.1: Undergraduate student composition in year prior to visitation

	Total number of undergraduate students	1452
	Total number of male students	206
	Total number of female students	1246
	Foreign students	165
	- from EU countries	82
	- from non-EU countries	83

9.1.2 STUDENT ADMISSION

Veterinary medicine is a so-called "Numerus clausus" subject; this means that the number of applicants is higher than the number of places at universities. The selection of students takes place at the Central Allocation Office (ZVS), a national agency, and is primarily based on the grade of the final exam at school. Currently, a grade of better than 2 on a scale from 1 (best) to 6 (worst) is required to have a chance of direct admission. The Central Allocation Office allocates 20 per cent of student places directly to applicants with excellent school leaving grades, a further 20% to those after a waiting time (at present ca. 4 years). For the last 2 years it has been possible for the remaining 60 per cent of the student places to be allocated directly by the universities. The TiHo first made use of this in 2006. The ZVS implements a pre-selection procedure among the eligible applicants on behalf of the University. The applicants have to name the TiHo as first university of preference and give proof of average grades of university entrance qualification up to 2.7. The applicants nominated by ZVS can participate in a veterinary medical orientated motivation test at the TiHo for ascertaining particular suitability. The test has been validated with veterinary surgeons in the various professional specialities. The test lasts ca. 30 min. and is performed in parallel by 25 students at University computer terminals.

The TiHo makes the ranking for admission after the results of this test. In addition the average grade of the schools final exam must be recognized and a completed state-recognised professional training lasting at least 2 years is considered.

Other possibilities for admission include: a.) any advanced qualification in a profession related to veterinary medicine (thereby avoiding the requirement of a school leaving examination), b.) transfer from a university of veterinary medicine outside Germany (only if places are vacant), or c.) transfer from related subjects (such as human medicine). This is of minor importance.

The number of students admitted each year is restricted. This number is calculated yearly on the basis of budget-staff (described in Chapter 4). The number of students enrolled in 2007 was 255.

The admission of extra students beyond official capacity may be forced through by legal action against calculation procedures of the university.

In 2007 8.7 applicants for each place in veterinary medicine at the TiHo were recorded. In comparison, the ratio of all applicants (5,762) to all places at all the faculties of veterinary medicine in Germany (1,050) was 5.5.

Students vary in their basic knowledge of natural sciences acquired at school as they can choose from different subjects to obtain their school leaving examination.

Recent changes in the National Teaching Obligation Regulation (Lehrverpflichtungsordnung) have increased the total number of places to 255. Measures have been taken to ensure that legal actions will not lead to any additional places in the future.

Table 9.2: Intake of veterinary students in the last five years

Year	Number applying for admission	number admitted	
		'standard' intake	other entry mode ¹⁾
2006	1,491*	232	+14
2005	1,154*	235	+18
2004	1,497	224	+27
2003	1,295	227	+28
2002	1,214	230	0
Average	1,330	229.6	17.4

¹⁾ Additional students due to the court's decision

* applicant numbers in the scope of the university's selection procedure (60% of all applicants)

9.1.3 STUDENT FLOW

Table 9.3: Student flow and total number of undergraduate veterinary students

Number of students present after admitted year 1		Number of additionally admitted students
1st year ¹⁾	2001	233
		+ 0 = 233
2nd year	2002	223
		+ 7 = 230
3rd year	2003	220
		+ 6 = 226
4th year	2004	223*
		+ 12 = 235
5th year	2005	204
		+ 0 = 204
6th year	2006	197
		+ 0 = 197
>6th year		26
number undergraduate veterinary students		1,326
		1,351

¹⁾ Following one student year with admission in 2001, matching MNY: 2006

* 3 students had completed an ERASMUS student exchange and returned to their year in accordance with the regulations

Table 9.4: Number of students graduating annually in the last five years

Year	Number graduating
2006	213
2005	215
2004	187*
2003	117*
2002	257
Average	198 (214)¹⁾

* Exceptionally low numbers of students in these years: a new national veterinary curriculum with changes in the examination system has taken place, which had a strong effect on the number of final examinations.

¹⁾ Due to the changes in the national curriculum and unusual alterations in the years 2003 and 2004 the last 2 years are simply referred to in order to give the mean value, so that for further observations **214 annually graduating students are used.**

Table 9.5: Average duration of studies (distribution of students in years)*

Duration of attendance	Number
Year 0 ¹⁾	213
Year 1	8
Year 2	3
Year 3	2
Year 4	2
Year > 4	2

* 2006

¹⁾ Year matching MNY allotted to the veterinary curriculum

The requirements are regulated by the National Curriculum (TAppV) and by the specific conditions of study (Studienordnung) of the TiHo. The examinations are divided into three parts (See Chapter 5.3). Passing one part is a prerequisite for entering for the subsequent one. Failed examinations must be repeated in the following semester. Students will only be admitted to examinations if they can show proof of regular and successful participation in courses defined by the study program.

9.2 COMMENTS

Students' knowledge in the scientific disciplines varies widely before admission due to the fact that the course system in schools allows selection of subjects and thus students' knowledge is not comprehensive. This has to be considered for teaching in basic subjects (e. g. Crash course in chemistry before study entry).

The factors that determine the number of students admitted are regulated; the veterinary faculties in Germany have a common legal basis (Chapter 4, Factual Information).

Facilities at the TiHo are adequate for all students currently accepted (three lecture halls can accommodate all students of any one year). The teaching program addresses the optimal number of students for the various subjects and courses. Small group teaching, practicals, supervised work in laboratory courses all require a significant number of repetitions.

The progress made by students in their studies is good as students are highly motivated. The veterinary studies are fairly regulated, most students completing their studies in the regular study time of 5.5 years. Progress is verified through interactive teaching and by examinations.

More than 80% of the students admitted graduate.

9.3 SUGGESTIONS

The new admittance procedures are seen as favourable. The results will be evaluated in due course.

The selection process may be adapted to reward selectively excellent grades in natural science subjects in school. This could facilitate teaching in basic subjects.

10 ACADEMIC AND SUPPORT STAFF

10.1 FACTUAL INFORMATION

There are no budget posts solely for teaching or research. Instead, all academic staff in budget posts is required to use their time for teaching and research.

Academic staff in Clinics and to some extent in Paraclinical Institutes is officially calculated in the capacity calculation with a 30% reduction in teaching load due to duties in patient care and diagnostics. This calculation method acknowledges the workload of clinicians in clinical services. As a result there are more teachers available, the ratio of teachers to students admitted being more favourable.

Professors have a teaching load of eight hours and staff in permanent positions a teaching load of 10 hours of lectures. Seminars, group work and demonstrations are calculated as half or less. Staff with fixed-term contracts, have half as much. The semesters amount to 28 weeks per year (14 weeks in the winter semester and 14 in the summer semester). The last year (practical year) is not divided in semesters.

Table 10.1: Personnel in the establishment provided for veterinary training

	Budgeted posts (FTE)		Non-budgeted posts (FTE) ¹⁾		Total (FTE)	
	VS	NVS	VS	NVS	VS	NVS
1. Academic staff						
Teaching staff (total FTE) ²⁾						
Research staff (total FTE)						
Others (please specify) (FTE)						
Total FTE	139.7	37.1	57.8	26.9	197.5	64
Total FTE (VS + NVS)	176.8		84.7		261.5	
FTE providing last year teaching	176.1		81.9		258.0	
2. Support staff ³⁾						
a) responsible for the care and treatment of animals	64.9		15.9		80.8	
b) responsible for the preparation of practical and clinical teaching	167.1		46.6		213.7	
c) responsible for administration, general services, maintenance, etc.	199.2		16.5		215.7	
d) involved in research work						
e) others (please specify)						
Total support staff	431.2		79.0		510.2	
3. Total staff	608		163.7		771.7	

¹⁾ Non-Budget Posts are all those which are not paid from posts but from own income and research grants.

²⁾ All academic staff are obliged to perform teaching and research

³⁾ 2a) Animal carers, veterinary medical employees, drivers, blacksmiths etc. 2b) VMTA, laboratory assistants etc.; 2c) Administrative staff, cleaning staff, secretaries, technicians, librarians

Table 10.2: Allocation of academic (veterinary surgeon and non- veterinary surgeon) teaching staff – expressed as FTE – and support staff to the various departments

Institutes / Clinics	Academic teaching staff							Support staff					
	a) budget positions/ b) non-budget							a) budget / b) non-budget					
	Full prof VS		Full prof NVS	Assistant VS		Assistant NVS		Technical		Animal carers		Admin. ¹⁾	
a	b	a	a	b	a	b	a	b	a	b	a	b	
Clinic for Cattle	3			15	1.5			12.5	5.5	14		4.5	
Clinic for Horses	3			10	2.5			5.5	6	12	6.2	2	1
Clinic for Poultry	1	1		5.5	1.5			7	0.3	1		2	
Clinic for Small Ruminants	3			8	0.3			6.5	1	6		2.3	0.8
Small Animal Clinic	6			10	13	-	1.5	9	10.8	8.4	8.7	4.5	1.5
Reproductive Medical Unit of Clinics				-	0.5			3.6	1	2.5		1	
Institute for Food Toxicology			1	1		1	4.5	2	2			0.5	0.3
Institute for Analytical Chemistry			2	2		1.5	1	4.4	1.5			3	
Institute for Food Quality	1			9	2.2	1	1.1	18.5	1			1.5	
Institute for Microbiology	2	1		3	3	1	1	6	1.5			2	1
Institute for Parasitology inc. Fish Pathology and Fish Farming	2			4	3.3	2		5.5	2.5	3	1	1.5	
Institute for Virology	2		1	1	3.5	2	2.5	7	2.5	2.5		1	
Institute for Biometry			1	0.7	1	2.1	1		2			5.5	0.7
Institute for Anatomy	2		1	6				11	0.2			0.5	
Institute for Physiology	1			4	1	2.5	3	7.5	0.4	2		1	
Institute for Animal Nutrition	1			4	1			7.4	1.5	2.5		1	
Institute for Immunology				-	1	2		2.5	0.5	1		0.5	
Institute for General Radiology and Medical Physics			1			2	2	2.2	2			1.5	1.5
Institute for the History of Veterinary Medicine and Domestic Animals	1							0.2				0.9	
Institute for Pharmacology	2			3	2	3	1.5	6	0.5	3		1.5	
Institute for Animal Breeding and Genetics	1			2	2.5	2	1	4.7	0.5	1		2	
Institute for Animal Hygiene, Animal Welfare and Behaviour of Farm Animals	1			2	2.5	-	1	3		1		1.5	
Institute for Animal Welfare and Behaviour (Pets, Laboratory Animals and Horses)	1					1	0.5	1.3	0.5			0.5	
Institute for Pathology	2			8	9.5	-	4	11	0.4			2.7	3
Institute for Biochemistry			3	1	0.5	1	1	5		1		1	
Institute for Reproductive Biology	1		1	2.5		1	0.3	4				0.6	
Field Station, Bakum	1			1	3.5	1		3	2.5			1	
Farm for Education and Research in Ruthe								10.8		4		3.2	
Administration												148.5	6.7
Totals	37	2	11	102.7	55.8	26.1	26.9	167.1	46.6	64.9	15.9	199.2	16.5

¹⁾ Administration including administrative staff, technicians, gardeners, cleaning staff, librarians

Academic and Support Staff

Neither the biologically equipped Institute for Zoology nor the Institute for Animal Ecology and Cell Biology are listed here since the teaching obligation is included under biology (BSc course of studies).

Academic teaching staff:

VS: 139.7 a) budget positions + 57.8 b) non-budget positions = 197.5

NVS: 37.1 a) budget positions + 26.9 b) non-budget positions = 64.0

Total budget academic staff: 176.8

Total budget and non budget academic staff: 261.5

Support staff in veterinary training:

Technical staff and animal carers:

232.0 a) budget positions + **62.5** b) non-budget positions = **294.5**

Administration:

199.2 a) budget positions + **16.5** b) non-budget positions = **215.7**

Total support staff:

Total budget support staff: 176.8

Total budget and non budget support staff: 261.5

Tab. 10.3: Student/ **budget** staff ratios

R1	no. total academic FTE in veterinary training ³⁾ no. undergraduate veterinary students ²⁾	=	$\frac{176.8}{1,351}$	=	$\frac{1}{7.6}$
R2	no. of total academic FTE at TiHo ¹⁾ no. undergraduate students at TiHo	=	$\frac{195.3}{1,351 + 285}$	=	$\frac{1}{8.4}$
R3	no. total VS FTE in veterinary training ³⁾ no. undergraduate veterinary students ²⁾	=	$\frac{139.7}{1,351}$	=	$\frac{1}{9.7}$
R4	no. total VS FTE in veterinary training ³⁾ no. students graduating annually	=	$\frac{139.7}{214}$	=	$\frac{1}{1.5}$
R5	no. total FTE academic staff in veterinary training ³⁾ no. total FTE support staff in veterinary training ³⁾	=	$\frac{176.8}{431.2}$	=	$\frac{1}{2.4}$

¹⁾ Takes into account the entire budget academic staff of the TiHo (incl. institutes teaching biology) and all students. TiHo plus students from the biology diploma course, those pursuing a biology teaching certification and BSc in biology, who are enrolled at the University of Hannover (the number here is the percentage corresponding to the teaching efforts of the lecturers at the TiHo).

²⁾ Table 9.3 ³⁾ Table 10.1

To facilitate a small group work all non budget staff is included in veterinary training which results in a ratio $R1 = 261.5 / 1351 = 5.2$. The other ratios would change accordingly.

Since the University of Veterinary Medicine Hannover became an endowed university within a public foundation, with effect from 1 January 2003, the management responsibility has changed. Once a year the Foundation Board of Trustees of the University decides the staffing plan as part of the business plan. This staffing plan contains the all staffing posts of the TiHo. Approval of the Foundation Board of Trustees is required when increasing or changing the staffing plan. The basis for budget FTEs is the total number of available posts, financed by the State. These posts are the principle on which the capacity is calculated, i.e. the number of student places.

The staffing plan contains as an enclosure an overview of the distribution of the posts to the individual TiHo institutes, which are currently confirmed along with the staffing plan by The Foundation Board of Trustees. Cost neutral changes in posts in the University facilities can be made by the Presidium during the current business year.

In the free market economy there are often higher potential earnings. Staff recruiting and keeping staff is often challenging in spite of job security in the public sector. Particularly challenging is recruiting the rising generation of scientists for the fields for which there is a particular demand in the economy and in practice, such as pathology, pharmacology, infection medicine and clinical specialisation.

The University had to accept the last savings measure of the so-called University Optimising Concept (Hochschuloptimierungskonzept) (HOK) decided by the Ministry for Sciences. The HOK committed the Universities in Lower Saxony from 2004 onwards to drastic savings which were to be realised almost exclusively by cutting unfilled posts or those becoming vacant. The TiHo as an independent university has targeted the large part of savings in the field of non-scientific staff (34.5 positions, incl. administration). Only a total of 7 budget-positions for scientists were cut. There has been a significant increase in non-budget academic staff in recent years.

In principle, it is unproblematic to employ additional staff from service income.

Income from services (clinical, diagnostic) and from research grants is spent on increasing the number of staff posts, both academic and support staff posts. Although not considered in the capacity calculation, it is common practice that all are involved actively in the teaching efforts on a voluntary basis only, thus contributing to intensive teaching in small groups.

Outside work including consultation and private practice by staff working at the establishment: Although, the legal possibility exists for heads of veterinary medical

clinics and clinical departments to treat animals privately, this is not practised at the TiHo. With the Directors of clinics so-called head of departments contracts have been closed. According to these contracts the clinic heads are fully responsible for all clinical services, there is no possibility for private liquidation.

There are good opportunities for academic staff to attend scientific meetings. In general the costs have to be met out of the Institute`s budget or from grant money. PhD students receive in general 500.-€ for attendance of scientific meetings during their studies.

The TiHo provides an annual budget of about € 150,000 to the Equal Opportunities Office (Gleichstellungsbüro). Funds are available for career support for women, including attendance of scientific meetings.

Sabbatical leave is generally approved by the TiHo for professors only. However, there are no financial provisions for substitute teachers, so that other scientific staff have to take over the additional teaching load.

10.2 COMMENTS

The student teacher ratio is tightly fixed by the legal capacity regulation and cannot be altered by the TiHo. However to facilitate small group teaching special student assistants (wissenschaftliche Hilfskräfte) are employed, partly financed from student fees.

As higher salaries are regularly offered to veterinary specialists by industry and large private practices, some positions are difficult to fill.

Because of the inflexible salaries in comparison with the private sector and in light of the fact that most academic positions are limited in time, it will become increasingly difficult to fill academic positions adequately and to motivate young scientists to choose an academic career.

There are 176.8 employees on budget positions for the academic staff, 79% of which are veterinarians. The proportion of 21% non-veterinarians reflects a fair degree of scientists from other natural sciences in multi-disciplinary teaching and research.

10.3 SUGGESTIONS

TiHo may wish to consider to apply for a new model of study course in order to get an even more favourable teacher/student ratio.

11 CONTINUING EDUCATION

11.1 FACTUAL INFORMATION

The TiHo faculty staff is regularly involved in continuing education programs as speakers and chairpersons on a national and international basis, e.g. with invitations from international organisations.

Further, in accordance with the TiHo-mission, the TiHo sees it as an important task to offer continuing education at the University. Some of the continuing trainings take place in cooperation with the Chamber of Veterinaries (Tierärztekammer Niedersachsen) or with state institutes such as LAVES and are recognised by ATF (Akademie für Tierärztliche Fortbildung – Academy for Veterinary Continuing Education). Further, teachers of the TiHo are frequent guest speakers in externally organised Continuous Professional Education (CPE) programs e.g. Bpt-congress (veterinary practitioners) and DVG (German Veterinary Society). The main areas of CPE-involvement are: clinical subjects, veterinary public health, animal welfare, reproduction, infectious diseases. WHO symposium on veterinary public health, poultry specialist talks, current themes of animal welfare and the conference on swine diseases have been established for decades.

In addition to conferences the TiHo also offers e-learning and blended learning as continuing education. For example, in cooperation with the Chamber of Veterinaries (Tierärztekammer Niedersachsen) and the State Office for Consumer Protection and Food Safety (LAVES, Niedersächsischer Landesamt für Verbraucherschutz und Lebensmittelsicherheit) there exists a training course for veterinary surgeons on actual epizootic diseases in a crisis situation per e-learning. In the pilot project “avian flu” lectures are digitally prepared by experts and made available per internet.

Furthermore, the mandatory refresher course in radiation safety is being developed as an e-learning course and will be offered via blended learning in future.

The Institute for Animal Breeding and Genetics and the Small Animal Clinic are involved in the development of the multimedia program "Inherited diseases of the dog". The program can be used offline on a private PC or via the internet. The program addresses veterinary surgeons and students as well as dog breeders and owners and provides information on the clinical symptoms, diagnosis and therapy of 60 hereditary diseases.

Table 11.1: Courses organised by the establishment itself recently

Year	Title of course	Number of participants	Total number of hours of the course
2006	Herd health management on pig farms	120	16
2006	Mycoplasma infections in pigs	100	3
2006	Seminar on diagnosis of fish diseases	20	5
2006	Workshop on clinical diagnosis of fish diseases	13	2
2006	Seminar on diseases in ornamental fishes	25	4
2006	Pain symposium	100	1
2006	ATF-Module on Behaviour	80	5
2005	Friedrich Loeffler (1852-1915) – Highlights of animal microbiology	90	8
2007	History of gynaecology and andrology of domestic animals	110	8
2006	Combating pests	160	8
2006	Epizootic diseases, consumer fears and food safety	250	8
2006	Combating salmonella in pigs and poultry	200	8
2006	Risk orientated meat examinations	220	8
2006	60 years BVD	150	5
2006	Course on radiation protection for veterinary surgeons	92	2 × 8
2006	Principles of dog breeding and breeding plans	100	8
2006	Generalised linear models in animal breeding	8	40
2006	Basic techniques in animal genetics and breeding	15	36
2006	Computation of random and fixed effects in animal breeding using PEST	7	40
2006	Creation of integrated databases for genetic evaluation and statistical analysis using the APIIS framework	7	40
2006	Segregation analysis to test for the mode of inheritance	7	40
2006	Advanced techniques in animal genetics and breeding	15	30
2006	Current problems of animal welfare (ATF-Congress, 2 days)	200	16
2006	Food toxicology – deficits, contaminants and contents: risks and consumer protection	30	24

2006	Descriptive epidemiology	30	16
2006	Analytical epidemiology	30	16
2006	Veterinary diagnostics	18	16
2006	Monitoring and surveillance for animal diseases	18	16
2006	Drug law for trainees in public veterinary health	8	28 (2 h per week)
2006	Reproductive medicine in small animals	300	7
2006	Pig diseases	240	8
2006	DVG-diseases of small ruminants	100	12
2006	Flock health management in organic farming	150	12
2006	AI-management in pigs	50	3
2006	Computer-assisted semen analysis	40	7
2006	Gynaecology, obstetrics and neonatology in dogs and cats in small animal curriculum	15	14
2006	Equine reproduction, the equine medicine, Berlin	130	17
2006	39th Conference on Physiology and Pathology of Reproduction	235	16
2006	Reproduction event in the scope of an open-day: - program for veterinary surgeons - farmers	200	6
		100	6
2006	19th Workshop of the Hannover Section on Equine Illnesses	450	16
2006	Neurology in equine medicine, Berlin	35	17
2006	Orthopaedics II in equine medicine, Berlin	50	17
2006	Cardiology in equine medicine, Berlin	130	17
2006	Equine reproduction in equine medicine, Berlin	40	17
2006	Classical examples	100	14
2006	2 specialist discussions (poultry diseases seminar, Hannover)	120 each	8

11.2 COMMENTS

The quality of continuing education of the TiHo is exceptionally high and combines current themes with up-to-date scientific research findings. The number of veterinarians who participate in further training events at the TiHo is large since the high quality of the events is well-known.

At the TiHo diverse lectures and specialist conferences have already been digitalised in quick-time format as online lectures and been made available via the internet (<http://www.tiho-hannover.de/service/elearning/oll/oll.htm>). In the pilot project “Avian Influenza” lectures by experts were digitally prepared and made available per internet.

11.3 SUGGESTIONS

TiHo intends to provide organisational support to individuals or groups who organise CPE.

Nevertheless, all such activities require a high degree of motivation, dedication and extra effort and are seen at the TiHo as an integral part of a university teaching position. Yet, this effort should be rewarded in the TiHo`s internal index system.

12

POSTGRADUATE EDUCATION

12.1

FACTUAL INFORMATION

The TiHo offers the following postgraduate educational programs:

Program	Description
Dr. med. vet.	After the licence to practise veterinary medicine students of veterinary medicine can complete research work at any scientific establishment of the TiHo, which ends after 2 to 3 years with the completion of a dissertation. After a successful disputation the title of Dr.med.vet. is awarded.
PhD program “Veterinary Research and Animal Biology”	For students with a first degree in veterinary medicine, human medicine, or one of the biosciences. Due to the broad variety of Institutes and Clinics involved, the program offers a multitude of topics and methods applied in various clinical and paraclinical fields of research. In their particular project of interest a PhD student together with his/her supervisor devise an individual training program. The program has a regular duration of three years. Within this period the research project has to be completed, a comprehensive exam has to be passed at the end of the first year, a PhD thesis has to be written and a final exam has to be passed, leading to the PhD degree.
PhD program “Systems Neuroscience”	For graduates of various life sciences (biology, veterinary and human medicine, biochemistry and affiliated natural sciences, such as physics). In the 3-year program PhD students will gain broad multidisciplinary knowledge in the field of neuroscience and develop valuable complementary skills.
PhD program “Infections Biology”	The 3-year program, with English as the teaching language, plays a pivotal role in the training of young scientists in the field of infection biology. The program's objective is to investigate the complex interactions between host and pathogen as well as basic research with the combined tools of immunology, cell biology and molecular biology. 20 students from around the world are accepted each year after a rigorous selection procedure. The study program is supported by the Wilhelm-Hirte Foundation, by scholarships provided by Hannover Medical School and by Georg-Christoph-Lichtenberg scholarships and administrative positions by the Ministry of Science and Culture of Lower Saxony.
Veterinary Specialist – National Board	Various programs depending on subject, lasting 5-6 years. See Table 12.1.1.
European Colleges, Resident Education – Specialists in accordance to the European Board of Veterinary Specialisation (EBVS)	Various programs exist in the different TiHo clinics and some paraclinical institutes (especially Pathology). The programs are recognized and evaluated by the respective colleges' Credential Committee and last between 2 and 3 years. A combined PhD-Residency Program is made possible for individual persons. See Table 12.1.1.

Postgraduate Education

Formalised postgraduate courses taught at the TiHo at both Diploma and Master's levels are solely intended for biology and biochemistry students. Therefore, these courses have not been listed here. Additionally, the staff giving these courses is not included in the staff listed in Chapter 10.

12.1.1 CLINICAL SPECIALITY TRAINING (INTERNS AND RESIDENTS)

Table 12.1.1: Clinical speciality training

Subject	No. interns	Specialist, national board (FTA)	No. Residents		Funding
				Diploma or title anticipated	
Porcine Health Management			3	Dipl. ECPHM	no funding
Pig Diseases		11		Veterinary Specialist in Pigs	6 salary
Fish Medicine		4		Veterinary Specialist for Fish Diseases	salary
Animal Nutrition and Dietetics		4		Veterinary Specialist for Animal Nutrition and Dietetics	salary / grant
Veterinary and Comparative Nutrition			2	Diplomate of the ECVN	salary / grant
Physiology		2		FTA Physiology	grant
Microbiology		1		FTA Microbiology	salary
Milk Hygiene		3		Veterinary Specialist for Milk Hygiene	salary
Food Science		18		Veterinary Specialist for Food Science	4 salary 12 grants
Molecular Genetics and Animal Breeding		3		Veterinary Specialist for Molecular Genetics and Animal Breeding	salary
Animal Hygiene		2		Veterinary Specialist for Animal Hygiene	salary
Animal Welfare		1		Veterinary Specialist for Animal Welfare	salary
Animal Behaviour		1		Veterinary Specialist for Animal Behaviour	grant
Food		1		Veterinary Specialist for Food	salary
Epidemiology		2		Veterinary Specialist for Epidemiology	salary
Pharmacology and Toxicology		10		Veterinary Specialist for Pharmacology and Toxicology	grants or salaries

Internal Medicine Small Animals			3	Dipl. ECVIM-CA	grant
Neurology			2 conforming; 2 non-conforming	Dipl. ECVN	salary; non-conforming, no funding
Internship Small Animals	12				Grant
Small Animal Diseases		7		Veterinary Specialist for Small Animal Diseases	Salary
Small Ruminant Diseases		2		specialist for small ruminant diseases	Salary
Laboratory Diagnostics		1		specialist in clinical laboratory diagnostics	Salary
Reproductive Medicine		8		specialist in reproductive medicine	4 grant or salary
Anatomy		2		specialist in anatomy	Salary
Parasitology		3		specialist in parasitology	salary
Cattle Diseases		6		Veterinary Specialist in Bovine Diseases	salary
Clinical Biochemistry		1		Veterinary Specialist in Clinical Biochemistry	salary
Bovine Herd Health Management	3				Salary
Bovine Herd Health Management			6	Dipl. of ECBHM	salary
Equine Diseases		4		Veterinary Specialist for Horses	Salary
Equine Surgery			1	Diplomate ECVS	Salary
Equine Internal Medicine			2	Diplomate ECEIM	Salary
Rotating Internship Clinic for Horses	8				Salary
Pathology			27	Diplomate of the ECVP	Grant
Poultry Diseases		4		Veterinary Specialist in Poultry	Salary

Some postgraduate students (PhD and Dr. med.vet.) are involved in this training (double training, combined program).

12.1.2 RESEARCH EDUCATION PROGRAMS

Every year between 120 and 180 veterinary surgeons receive their doctorate in veterinary medicine at the TiHo. Most of them receive a salary or grant. This degree is conferred to veterinary surgeons who have performed 2 to 3 years of research work and written a thesis on the subject worked on; the exact requirements are outlined in the rules for obtaining a doctorate in veterinary medicine (Promotionsordnung). (This text is available at http://www.tiho-hannover.de/einricht/vw/dez_3/promo.htm in German only.) Studies for this postgraduate degree include some formalised coursework such as classes in statistics, journal clubs. Thesis students have to give 2 public oral presentations on their research topic.

The introduction of a PhD program was supported by the local government and accepted as a postgraduate education. Therefore, PhD studies are calculated in the capacity calculation.

Table 12.2: Number of research students enrolled in different programs

Type of degree	Full-time	Part-time	Duration
PhD-Program: Veterinary Research and Animal Biology	36		3 years
PhD-Program: Systems Neurosciences	22		3 years
PhD-Program: Infections Biology	3		3 years
Dr. med. vet	65	263	2 to 3 years

The students in the PhD program receive a grant or a salary for 3 years. Financing has to be guaranteed for at least 2 years at the start of the research work. The students studying for their doctorate (Dr.med.vet.) partly receive a payment from assistant work or from grants. 71% of the doctorate students listed above receive payments.

12.2 COMMENTS

The qualification for becoming a veterinary specialist of the National Board (Fachtierarzt) is frequently begun during the doctoral thesis research. The TiHo declares its support to the specialisation according to the rules of the European Colleges and strives to extend the possibilities for qualifying. The European diplomate is a prerequisite for new appointments in the clinical sector.

The high number of graduates receiving a veterinary doctorate degree each year is encouraging, as it indicates their principle competence in research. It is expected that the number of veterinary graduates deciding to embark on the PhD programs will further increase. The implementation of Junior Professor positions by the federal government as well as the decreasing emphasis of the postgraduate habilitation degree are likely to make the PhD program more attractive, resulting in an increase in the student intake.

Financing a PhD program is constantly challenging as there are only few TiHo funds available for it. Funding for the Research Training Groups by the German Research Foundation (DFG) has given some relief, as the students involved in these groups can be awarded grants to support their research. Further, The Ministry for Science and Culture of Lower Saxony is a great supporter in awarding grants for the PhD programs in Infection Biology and Systems Neuroscience. Nevertheless, the pursuit for alternative monetary sources has to be intensified.

12.3 SUGGESTIONS

The PhD programm is running well; however, the percentage of PhD students in the clinics could be higher. In the clinical subjects the traditional doctoral program is preferred by most students. Clinics are to intensify their participation in the PhD programs.

More available sources have to be made accessible for fund-raising of grants for postdoctoral education. In this context cooperation with industry should be extended.

13 RESEARCH

13.1 FACTUAL INFORMATION

Undergraduate students have the option to be involved in research in their practical years within the intramural practical in the Paraclinical Institutes (14 weeks) and additionally for half of the extramural practical time (8 of the 16 weeks). The practicals can be completed in the Institutes for Physiology, for Food Quality and Food Safety, for Pharmacology, Toxicology and Pharmacy, for Immunology; for Animal Nutrition, for Animal Breeding, for Animal Hygiene, for Pathology as well as the Institutes for Parasitology, Virology, Microbiology, Biochemistry, Biometry and Fish Diseases affiliated to the Centre for Infections Medicine.

Furthermore, the Institutes of the Centre for Infections Medicine run a Summer School in the lecture-free period.

Outside of the curriculum undergraduate students are welcome to participate in research in all Institutes and Clinics, special electives are offered. All teaching classes present evidence-based medicine.

In order to increase the research interest of undergraduates, the TiHo has been actively promoting the application of students for leadership programs (in Cornell, USA and Cambridge, England); thus, the top 10% of students of any one year receive a letter informing them of these programs. Also, the Foreign Academic Affairs Office and the SOCRATES appointee inform and actively try to recruit students for exchange visits at other universities where they will – at least in part – work on a research project.

Seminars and special lecture series in which the establishments of the TiHo present their research projects should introduce undergraduate students to research and get them to be enthusiastic about it.

13.2 COMMENTS

The opportunity for possible participation in research projects has increased with the introduction of the practical year, since in addition to the already possible 8 weeks a further 14 weeks have been added. Now the students have the possibility for an extended laboratory period during their study time. Enough projects are offered, since a large part of the faculty is involved in ongoing research projects.

13.3 SUGGESTIONS

Information events on research projects at the TiHo have already attracted the interest of the students. The number of such events should be increased further; like for example, Graduate School Day, and research days in various Institutes.

14 GLOSSARY

German	English
Allgemeine Wahlpflicht	General electives
Allgemeiner Studentenausschuss, AStA	Student committee
Akademie für Tierärztliche Fortbildung	Academy for Veterinary Medical Further Training
Aufbaustudium	Postgraduate studies course
Beamtenangestelltentarif Ila, BATIla	Scientists' base salary, full-time equivalent
Berufsverband	Professional association
Bezirksregierung	Hannover regional government
Bundesforschungsanstalt für Landwirtschaft, FAL	Federal Agricultural Research Centre, FAL
Bundestierärztekammer	Federal German Chamber of Veterinaries
Currikularnormwert	National curriculum norm value
Deutsche Forschungsgemeinschaft, DFG	German Research Foundation, DFG
DFG-Graduiertenkolleg	DFG Research Training Group
DFG-Sonderforschungsbereich	DFG Collaborative Research Centre
Drittes Teil des Staatsexamens	Third section of the clinical examination
Drittmittelstelle	Non-budgeted position
Erprobungsklausel	Trial clause
Erster Teil des Staatsexamens	First section of the clinical examination
Fachkommissionen	Central Commissions
Fachtierarzt	National board certified veterinary specialist
Frauenbeauftragte	Equal Opportunity Officer
Frauenbüro	Equal Opportunity Office
Gesellschaft für biotechnologische und Forschung, GBF	German Research Centre for Biotechnology, GBF
Gremien	Committees
Grundordnung	Basic governing principles of the TiHo
Helmholtzzentrum für Infektionsforschung	Helmholtz Centre for Infection Research
Hochschulentwicklungskommission	University Developmental Commission
Hochschule in der Trägerschaft einer rechtsfähigen Stiftung des öffentlichen Rechts	Endowed university within a legally autonomous public foundation
Hochschuloptimierungskonzept (HOK)	University Optimising Concept
Intensivklinik	Intensive week spent in a single clinic
Kapazitätsverordnung	National teaching capacity regulation
Klinikum	Clinic complex
Kompetenzzentrum Hochschuldidaktik für Niedersachsen	Competence Centre for University Didactics for Lower Saxony
Kosten-Leistungsrechnung	Cost and management accounting
Krankenbericht	Case report
Lebensmittelaufsichtsamt	Food regulatory agency

Lehrverpflichtungsverordnung	National teaching obligation regulation
Maul- und Klauenseuche, MKS	Foot and mouth disease, FMD
Ministerium für Ernährung, Landwirtschaft und Forsten	Ministry of Nutrition, Agriculture and Forestry
Ministerium für Wissenschaft und Kultur	Ministry of Science and Culture
Niedersächsisches Gesetz- und Verordnungsblatt	Lower Saxony legislative record
Niedersächsisches Hochschulgesetz, NHG	Lower Saxony university law
Niedersächsisches Landesamt für Verbraucherschutz und Lebensmittelsicherheit	Lower Saxony State Office for Consumer Protection and Food Safety
Physikum	Second preclinical examination
Planstelle	Budgeted position
Promotionsordnung	Rules for obtaining a doctorate
Prüfungsausschuss	Examinations Committee
Querschnittsfächer	Interdisciplinary subjects
Schweinepest	Classical swine fever, CSF
Spezielle Wahlpflicht	Special electives
Stiftungsrat	Foundation board of trustees
Studentensekretariat	Student Affairs Office
Studentensprechstunde	Student surgery
Studentenwerk Hannover	Hannover student services
Studienordnung	Conditions of study (of an establishment)
Tierärztekammer Niedersachsen	Chamber of Veterinaries of Lower Saxony
Tierärztliche Approbationsordnung, TAppV	National veterinary curriculum, TAppV
Tierärztliche Hochschule Hannover, TiHo	University of Veterinary Medicine Hannover, TiHo
Tierärztliche Prüfung	Veterinary Clinical Examination
Veterinäraufsichtsamt	Veterinary regulatory agency
Vorphysikum	First preclinical examination
Wahlpflichtveranstaltungen	Obligatory elective subjects
Zentrale Evaluations- und Akkreditierungsagentur Hannover	Central Evaluations and Accreditation Agent Hannover
Zentrale Studienkommission	Commission for Curricular Affairs
Zentrale Vergabestelle für Studienplätze, ZVS	Central allocation office for students
Zukunftsvertrag	Guarantee contract
Zweiter Teil des Staatsexamens	Second section of the clinical examination

Glossary

English	German
Academy for Veterinary Medical Further Training	Akademie für Tierärztliche Fortbildung
Basic governing principles of the TiHo	Grundordnung
Budgeted position	Planstelle
Capacity regulation	Kapazitätsverordnung
Case report	Krankenbericht
Central allocation office for students	Zentrale Vergabestelle für Studienplätze, ZVS
Central Commissions	Fachkommissionen
Central Evaluations and Accreditation Agent Hannover	Zentrale Evaluations-und Akkreditierungsagentur Hannover
Chamber of Veterinaries of Lower Saxony	Tierärztekammer Niedersachsen
Classical swine fever, CSF	Schweinepest
Clinic complex	Klinikum
Commission for Curricular Affairs	Zentrale Studienkommission
Committees	Gremien
Competence Centre for University Didactics for Lower Saxony	Kompetenzzentrum Hochschuldidaktik für Niedersachsen
Conditions of study (of an establishment)	Studienordnung
Cost and management accounting	Kosten-Leistungsrechnung
Curriculum norm value	Currikularnormwert
DFG Collaborative Research Centre	DFG-Sonderforschungsbereich
DFG Research Training Group	DFG-Graduiertenkolleg
Endowed university within a legally autonomous public foundation	Hochschule in der Trägerschaft einer rechtsfähigen Stiftung des öffentlichen Rechts
Equal Opportunity Office	Frauenbüro
Equal Opportunity Officer	Frauenbeauftragte
Examinations Committee	Prüfungsausschuss
Federal Agricultural Research Centre, FAL	Bundesforschungsanstalt für Landwirtschaft, FAL
Federal German Chamber of Veterinaries	Bundestierärztekammer
First preclinical examination	Vorphysikum
First section of the clinical examination	Erster Teil des Staatsexamens
Food regulatory agency	Lebensmittelaufsichtsamt
Foot and mouth disease, FMD	Maul- und Klauenseuche, MKS
Foundation board of trustees	Stiftungsrat
General electives	Allgemeine Wahlpflicht
German Research Centre for Biotechnology, GBF	Gesellschaft für biotechnologische und Forschung, GBF
German Research Foundation, DFG	Deutsche Forschungsgemeinschaft, DFG
Guarantee contract	Zukunftsvertrag
Hannover regional government	Bezirksregierung

Hannover student services	Studentenwerk Hannover
Helmholtz Centre for Infection Research	Helmholtzzentrum für Infektionsforschung
Intensive week spent in a single clinic	Intensivklinik
Interdisciplinary subjects	Querschnittsfächer
Lower Saxony legislative record	Niedersächsisches Gesetz- und Verordnungsblatt
Lower Saxony State Office for Consumer Protection and Food Safety	Niedersächsisches Landesamt für Verbraucherschutz und Lebensmittelsicherheit
Lower Saxony university law	Niedersächsisches Hochschulgesetz, NHG
Ministry of Nutrition, Agriculture and Forestry	Ministerium für Ernährung, Landwirtschaft und Forsten
Ministry of Science and Culture	Ministerium für Wissenschaft und Kultur
National board certified veterinary specialist	Fachtierarzt
National curriculum norm value	Currikularnormwert
National teaching capacity regulation	Kapazitätsverordnung
National teaching obligation regulation	Lehrverpflichtungsverordnung
National veterinary curriculum, TAppV	Tierärztliche Approbationsordnung, TAppV
Non-budgeted position	Drittmittelstelle
Obligatory elective subjects	Wahlpflichtveranstaltungen
Postgraduate studies course	Aufbaustudium
Professional association	Berufsverband
Rules for obtaining a doctorate	Promotionsordnung
Scientists' base salary, full-time equivalent	Beamtenangestelltentarif IIa, BATIIa
Second preclinical examination	Physikum
Second section of the clinical examination	Zweiter Teil des Staatsexamens
Special electives	Spezielle Wahlpflicht
Student Affairs Office	Studentensekretariat
Student committee	Allgemeiner Studentenausschuss, AStA
Student surgery	Studentensprechstunde
Third section of the clinical examination	Drittes Teil des Staatsexamens
Trial clause	Erprobungsklausel
University Developmental Commission	Hochschulentwicklungskommission
University of Veterinary Medicine Hannover, TiHo	Tierärztliche Hochschule Hannover, TiHo
University Optimising Concept	Hochschuloptimierungskonzept (HOK)
Veterinary Clinical Examination	Tierärztliche Prüfung
Veterinary regulatory agency	Veterinäraufsichtsamt
Veterinary specialist	Fachtierarzt

15 ABBREVIATIONS

Abbreviation	Explanation
AStA	Student committee
ATF	Academy for Veterinary Medical Further Training
BATIIa	Scientists' base salary, full-time equivalent
BgSE	President's advisory group for structure and development
CSF	Classical swine fever
CPE	Continuous Professional Education
DFG	German Research Foundation
EAEVE	European Association of Establishments for Veterinary Education
EBVS	European Board of Veterinary Specialisation
ECTS	European Credit Transfer System
EDP	Electronic Data Processing
ERL	Electronic Reference Library
FAL	Federal Agricultural Research Centre
FMD	Foot and mouth disease
GBF	German Research Centre for Biotechnology
GRK	DFG research Training Group
HACCP	Hazard Analysis and Critical Control Points
HEK	University Developmental Commission
HOK	University Optimising Concept
IVD	Company for Innovative Veterinary Diagnostics, IVD Ltd
IVIS	Integrated Veterinary Information System
LAVES	Lower Saxony State Office for Consumer Protection and Food Safety
MHH	Medical School Hannover
MNY	Minimum number of years
MWK	Ministry of Science and Culture
NHG	Lower Saxony university law
NVS	Non-veterinary surgeon
SER	Self Evaluation Report
SFB	DFG Collaborative Research Centre
SOP	Standard operating procedure
SRM	Specific Risk Material
TAppO	National veterinary curriculum
TAppV	National curriculum regulations
TiHo	School of Veterinary Medicine Hannover
VMTA	Veterinary Medical Technical Assistant
VS	Veterinary Surgeon
WHO	World Health Organisation
W-LAN	Wireless Local Area Network
ZEVA	Central Evaluations and Accreditation Agent Hannover
ZSN	Centre for Systems Neuroscience
ZVS	Central allocation office for students